Errata

p. 89, line 15: ...	BECK 1976; **comp.** ...
p. 99, line 2: ...	measuring instruments, p. **91**).
line 37: ...	intervals **of** 8 or 14 days
p. 105, line 6: ...	photo-eclectors, the ...
p. 117, line 28: ...	in the upper trunk / canopy region.
p. 121, line 6: ...	species / (family) N ↑ N ↓
p. 131, line 8: ...	1968). *Uranoscodon superciliosum* ...
line 15: ...	disregarded (p. **105**): ...
line 23: ...	and Gastropoda were captured.
p. 132, Table 14: add:	**+without Diptera-imagines (comp. p. 156);** ***without Formicoidea.**
p. 136, line 24: ...	*andina evae* **(comp. p. 150).**
p. 142, Table 20: ...	6 Araneae > 5 mm
p. 145, line 37: ...	Two deutonymphs ...
p. 156, line 15: ...	trunk region **too**.
p. 158, line 4: ...	trunk migration – **upwards** (July – Oct. 1976) trunk migration – **downwards** (Aug. – Dec. 1976)
p. 162, line 31: ...	(broad sense; nonmigrants, migrants) ...
p. 163, line 25: ...	at all which – **despite high losses in eclectors** – may ...
p. 167, line 22: ...	Formicoidea foi dominante ...
p. 168, line 17: ...	grateful to the companies ...

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From cooperation between Max-Planck-Institute for Limnology, Working group "Tropical Ecology", Plön, West Germany, and Instituto Nacional de Pesquisas da Amazônia, Manaus–Amazonas, Brazil

Da cooperação entre Max-Planck-Institut für Limnologie, Arbeitsgruppe Tropenökologie, Plön, Alemanha Oc., e Instituto Nacional de Pesquisas da Amazônia, Manaus–Amazonas, Brasil

Comparative ecological Studies of the terrestrial arthropod fauna in Central Amazonian Inundation-Forests

by

Joachim Adis

Max-Planck-Institute for Limnology, Working group "Tropical Ecology",
Plön, West Germany

Contents

1. Introduction

The water-levels of the Solimões and Negro Rivers fluctuate throughout the year. Near Manaus, the difference between high and low water can be 14 m. During high water vast forest areas near rivers are flooded for 5 - 6 months. Adaptions of animals and the importance of arthropods in the "inundation-forest" ecosystem are insufficiently known (BECK 1971; SCHALLER 1969, 1973; SCHUBART and BECK 1968). Horizontal and vertical migrations, depending on periodic water fluctuations, have only been studied for some animal groups (BECK 1969, 1972, 1976; IRMLER 1973, 1975, 1976, 1978, 1979a). Until now, suitable capture methods for the qualitative/quantitative sampling of arthropod populations have been lacking. Important progress is represented by ground and arboreal photo-eclectors, developed by FUNKE (1971) during the IBP-Solling project of the German Research Foundation.

During a 'minimal program for ecosystem analyses' (FUNKE 1972, 1973, 1977a; GRIMM, FUNKE and SCHAUERMANN 1975) these apparatuses have been used in tropical inundation-forests (ADIS 1977a). Their catches allow statements to be made especially on the "activity density" (Aktivitätsdichte) of animals on the ground and on trunks. Species which change strata are being caught quantitatively in part.

The goal of this study was an inventory of the fauna (systematic and trophic groups/ species), the analysis of dominance, phenology and "activity dynamics" (Aktivitätsdynamik). Special investigations dealt with "reactions" of arthropods to periodic water

fluctuations, especially vertical migrations. For some species, the adjustment of life cycle and succession of generations to the extremely fluctuating conditions in the biotope have been well studied. Two inundation-forests of different localities ("white- and black-water area") have been compared with one another.

Of the animal material caught, part still requires a more intensive taxonomic study by specialists. For some groups, statements to species level are possible.

2. Study area, methods, animal material

2.1. Study area

2.1.1. Tarumã Mirím River

a) Geographic location, geomorphology, soil

The study area "inundation-forest, black-water" = "Igapó" (SIOLI 1956) is situated at the lower course of Tarumã Mirím River (Rio Tarumã Mirím) near its mouth at the Negro River, about 20 km upstream from Manaus (Fig. 1). The area is about 500 x 450 m (Fig. 2) and extends from the non-inundated "Terra firme" in the north with a constant slight declination (< 5 %) to the bank of the Tarumã Mirím River (profile see BECK 1976; co: SIOLI 1951b; TAKEUCHI 1962). The experimental area is quite centrally located in this study area and borders upon the Igarapé Nova Inveja to the East.

The root-filled soil consists of clay, silt, and sand material with alternating fractions. Its A-horizon is about 10 - 15 cm deep (humus layer = matting of roots with fine humus).

For detailed information on topography, geomorphology and evolution of the Igapó see BECK (1971), IRION and ADIS (1979), IRMLER (1975, 1977) and SIOLI (1956, 1975).

b) Vegetation, leaf fall

In the study area timber has been cut sporadically throughout the last few years. Nevertheless, the vegetation of the Igapó can largely be considered original (Fig. 3; comp. ARAUJO 1970; GESSNER 1968; HUBER 1909; IRMLER 1975, 1977; MOREIRA 1970; PRANCE 1975, 1979; TAKEUCHI 1962).

The herb strata is slightly developed (soil covering < 5 %). Grasses and ferns are found sporadically; only seedlings of abundant trees occur in large numbers (comp. HUECK 1972). Shrubs are absent. There are 1300 - 2000 trees/ha in the study area, which belong to 47 species (ADIS and RODRIGUES 1981). On the experimental area (150 x 100 m; comp. Fig. 2,3) about 80 % of all trunks show a circumference ⩽ 30 cm (measured at breast height); 43 trees (29/ha, about 2 %) have ⩾ 100 cm in circumference and belong to 10 species (Table 1). Dominant is *Aldina latifolia* BENTH *latifolia* (Leguminosae). Nineteen trees are buttressed. Their roots spread as far as 8 m on the forest floor; their ramification starts on the average at 9 m height (maximal tree height: 35 m); their average trunk diameter at breast height is 76 cm (max. Ø: 188 cm). Numerous epiphytes colonize the canopy. Tops of high trees (⩾ 20 m) come together almost completely. The relative luminous intensity on the forest floor is about 14 % (about 3870 1x, comparative values in the open air, overcast sky, at about 1 p. m.; comp. BRINKMANN 1970, 1071; CONCEIÇÃO 1977).

Leaf fall occurs mainly from June to August, within the first months of the dry season (submersion phase = inundation period; comp. ADIS et al. 1979). In the Igapó bare trees are rare. Formation of flowers mainly occurs at the beginning of the submersion phase in April/May. Time of flowering is apparently correlated with inundation phase. About 90 % of the annual production of fruits fall in June. Litter production (Sept. 76 - Aug. 77) is about 6,7 t/ha/year (dry weight; emersion phase: about 2,2 t/ha; submersion phase: about 4,5 t/ha).

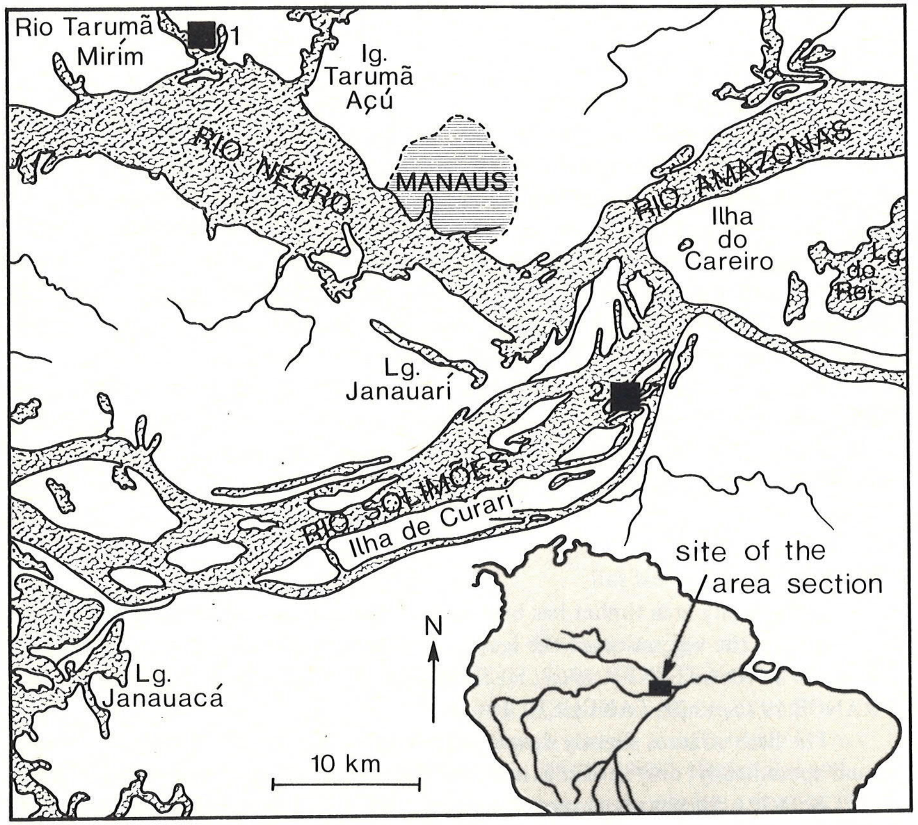


Fig. 1: Location of the study areas: 1 – Tarumã Mirím River (03°02' S 60°17' W),
2 – Curarí Island (03°15' S 59°49'W).
Sketch to IRMLER (1975).

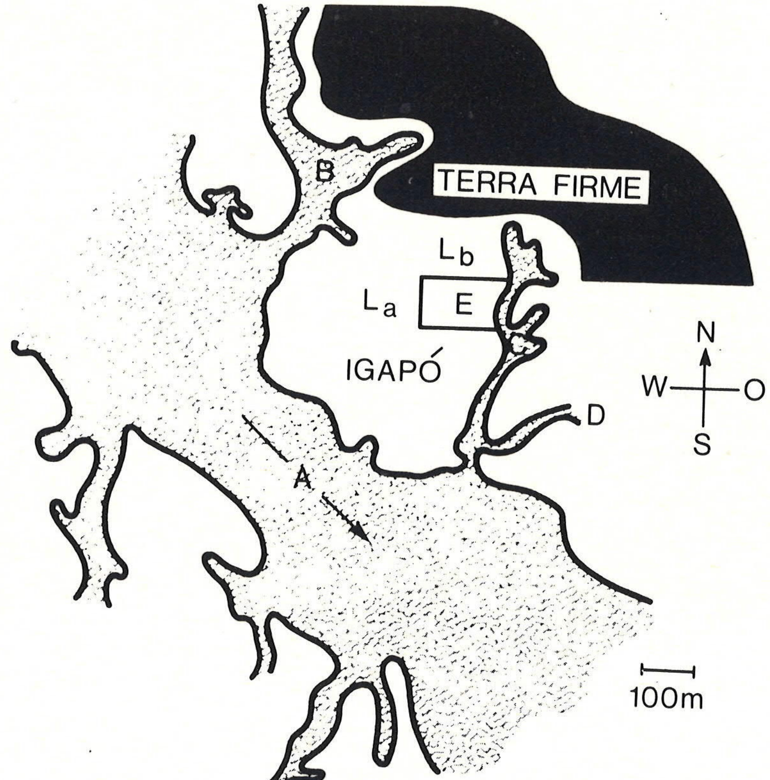


Fig. 2: Location of the study area at Tarumã Mirím River
A = Rio Tarumã Mirím, B = Igarapé São João, C = Igarapé Nova Inveja,
D = Igarapé Pupunha, E = experimental area, L_a/L_b = site of litter samplers.

c) Climate

The climate in the study area corresponds with the "Ami-climate" (KÖPPEN 1931): the lowest monthly mean temperature is + 18 °C (annual amplitude < 5 °C), the annual precipitation ranges between 1000 and 2500 mm (lowest monthly precipitation: 0 - 60 mm). The rainy season extends from December until May, the dry season from June until November. Rainy months literally are January - April; dry months literally are July - September. For more details on the climate of Manaus see ADIS (1977 b, c), BECK (1970), EIDT (1978), MINISTERIO DA AGRICULTURA (1968), REINKE (1962) and SIOLI (1956, 1968, 1975).

Weather conditions during the emersion phase 1976/77 are shown in Fig. 4 (comp. Table 4). For measurements in the forest stand one thermohygrograph (continuous records per month), one minimum-maximum thermometer, and one pluviometer (in the open air)

Table 1: Tree species on the experimental area (150 x 100 m) at Tarumã Mirím River; trunk diameter ⩾ 32 cm at breast height.

family / species	quantity	tree height (m) 15-19,9	⩾20	trunk circumference (cm) at breast height 100-149	150-200	⩾200	occuring buttressed
CARYOCARACEAE							
1 *Caryocar microcarpum* Ducke	2	-	2	1	-	1	
LEGUMINOSAE							
2 *Aldina latifolia* Benth var. *latifolia*	24	1	23	2	7	15	x
3 *Cynometra spruceana* Benth var. *phaselocarpa* (Hayne) Dewyer	1	-	1	-	1	-	
4 *Heterostemon minosoides* Desf.	1	-	1	-	1	-	
5 *Mora paraensis* Ducke	1	-	1	-	-	1	x
6 *Peltogyne venosa* Benth ssp. *densiflora* (Benth) *M. Silva*	2	-	2	-	1	1	x
7 *Sclerobium* sp.	1	-	1	-	-	1	
8 *Swartzia polyphylla* DC.	6	1	5	-	2	4	x
MORACEAE							
9 *Maquira coriacea* (Karsten) Berg.	1	-	1	-	1	-	x
VOCHYSIACEAE							
10 *Erisma calceratum* (Link) Warm.	4	1	3	-	1	3	x
total 1,5 ha:	43	3	40	3	14	26	
total 1,0 ha:	29	2	27	2	9	18	

Table 2: Amount of precipitation in Manaus during the 'rainy season' and 'dry season' respectively from June 1974 - May 1977.

'rainy season'	mm	'dry season'	mm
June 74 - Nov. 74	565,4	Dec. 74 - May 75	1849,7
June 75 - Nov. 75	550,7	Dec. 75 - May 76	1797,8
June 76 - Nov. 76	473,9	Dec. 76 - May 77	1491,9

Fig. 3: Experimental area at Tarumã Mirím River (Igapó) during rising water (March 1976; partial view). In the background buttressed trees.

were used. The monthly mean temperatures of the air (3 cm above the forest floor) ranged between + 24,3 and + 27,4 °C. The day/night variations reached 9 °C maximally. The relative humidity (monthly mean) 3 cm above the forest floor varied between 88,7 and 98,1 %. The day/night variations ranged between 54 and 100 % rel. humidity. The total amount of precipitation between November 1976 and May 1977 was 1092 mm (Manaus: 1648 mm). In January, especially 1977, there was a relatively low amount of precipitation (see Fig. 4). All together, there was less precipitation 1976/77 in the Central Amazon than in previous years. As characteristic value for the water saturation of the soil (W_K), the percentage portion of the soil humidity (vol. %) at the maximal water capacity of the soil (W_{Kmax} = 34 vol. %) was used (method of MITSCHERLICH, see MÜCKENHAUSEN 1975; THUN 1949).

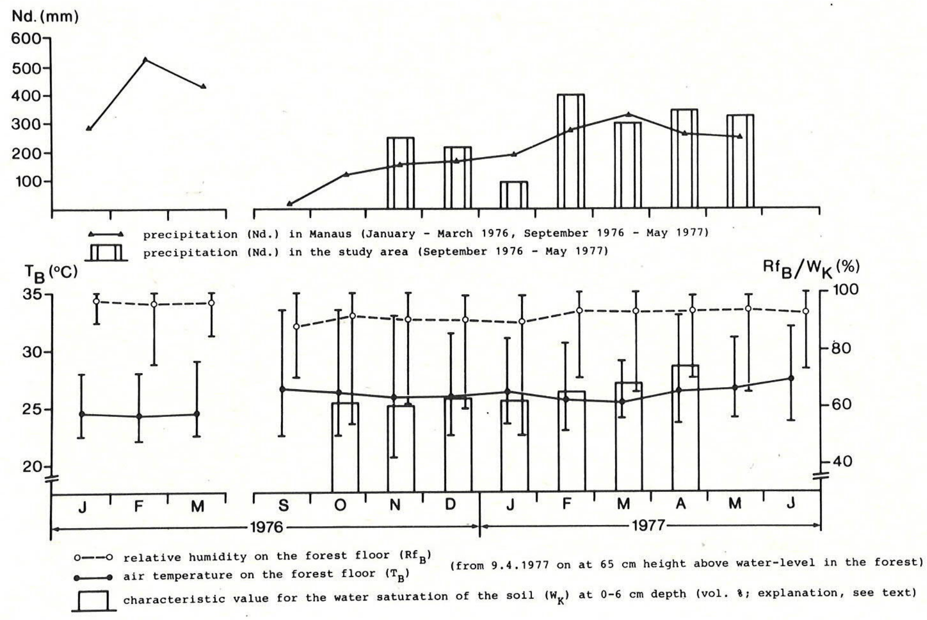


Fig. 4: Weather conditions in the study area Tarumã Mirim River from January – March 1976 and September 1976 – June 1977.

d) Water-level fluctuations

The Igapó is annually flooded for 5-6 months. These inundations are caused by high water-levels on the Negro River, dependent on precipitation in its main catchment areas of west and north Amazonia (BECK 1970). From November on, the water level near Manaus rises for seven months, arrives at its upper level in June and decreases from July until November (Fig. 5). The mean amplitude of the water-level fluctuations is 10 m. Extreme values are 14 m and 5,5 m (comp. IRMLER 1976; REISS 1976). In 1975/76 the difference between high- and low-water was 11,56 m (comp. Fig. 5).

During the study period (Jan. 1976 - June 1977) the experimental area was inundated twice:

emersion phase 1975/76: until March 31, 1976
submersion phase 1976: until Sept. 16, 1976 (= 5 1/2 months)
emersion phase 1976/77: until April 13, 1977 (= 7 months)
submersion phase 1977: from April 19, 1977

The high water flooded the Igapó in 1976 up to 3,55 m and in 1977 up to 3,35 m above ground (measurements at the highest point of the experimental area). No surface currents have been observed.

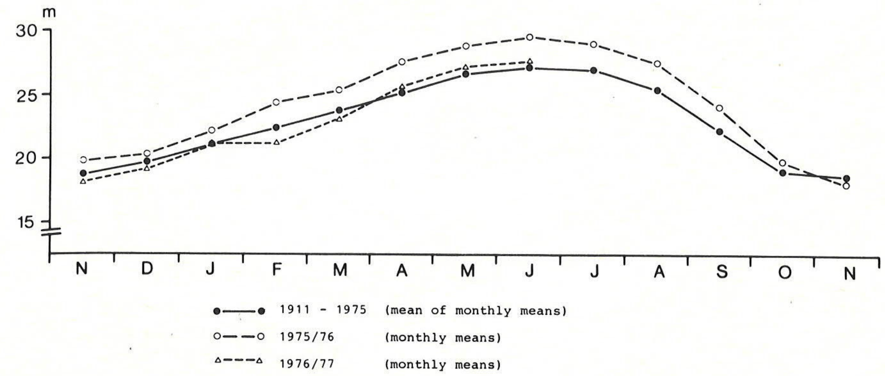


Fig. 5: Monthly water-levels of the Negro River in the harbour of Manaus; (with kind permission of the Administração do Porto de Manaus).

2.1.2. Curarí Island

a) Geographic location, geomorphology, soil

The study area "inundation-forest, white-water" = "Várzea" (SIOLI 1956) was situated on Curarí Island (Ilha de Curarí) on the right bank of the Solimões River, about 15 km upstream from the mouth of the Negro River into the Amazon. Age, original geographic location and size of Curarí Island could not be ascertained. The whole area at the lower Solimões River (Fig. 1) is flooded during high-water. Every year, the high load of suspended material of the river ("Flußschwebfracht"; IRION 1976 a) causes the formation of new bottom land in the bank area and new islands in the river. Bluffs (= bank dams, SIOLI 1968) are undermined by current and whirlpools. Constantly there occur new breakages, deposits and removal of sediments (MATTHES 1947; STERNBERG 1960). The size alterations of the study area between 1975 and 1977 are shown in Fig. 6. On December 31, 1976 (emersion phase), about 200 x 150 m of the river bank broke off. In February 1977, the remaining area was divided into two islands, which disappeared within the following two years.

The soil, poor in roots, mainly consisted of montmorillonite (IRION 1976 c; IRMLER 1975). During the emersion phase, dry cracks of up to one meter depth occured sporadically (comp. SIOLI 1951a). A humus layer was absent. During the submersion phase of 1976, about 10 - 20 cm of river sediments (= "mud"; comp. IRMLER 1975) were deposited on the level experimental area (see Fig. 6).

For detailed information on topography, geomorphology and evolution of the Várzea region see IRION (1976a, b, c), IRMLER (1975, 1977) and SIOLI (1951a, b, 1956, 1964).

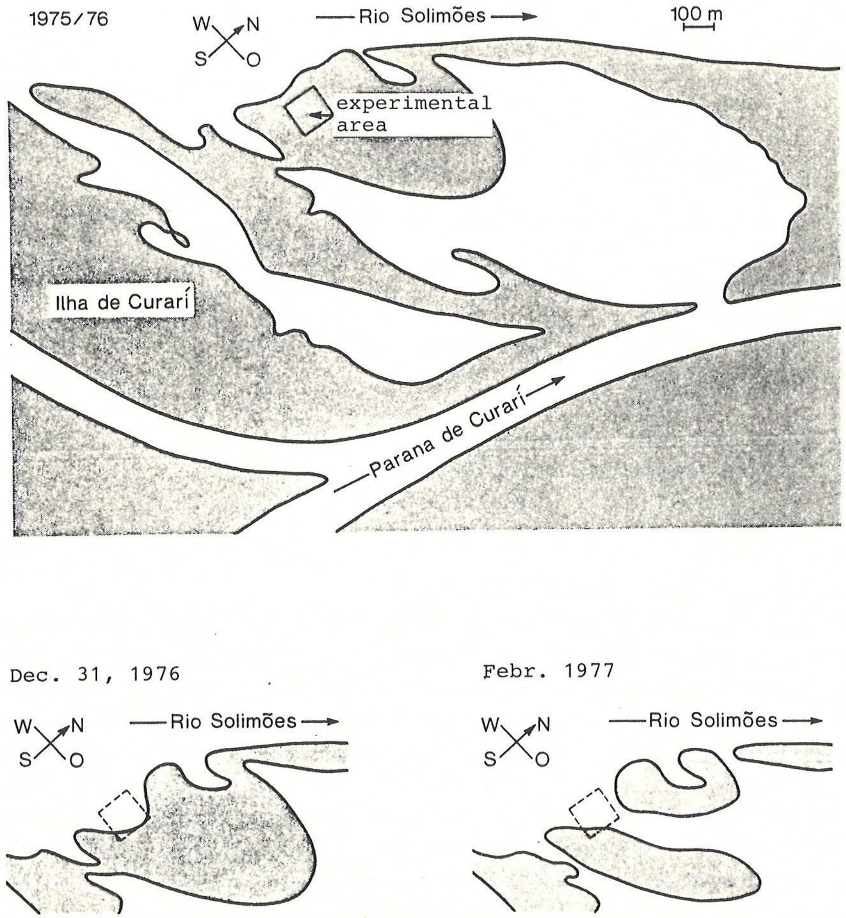


Fig. 6: Location of the study area on Curarí Island (from IRMLER 1975); size alterations from 1975 – 1977.

b) Vegetation, leaf fall

The study area was the remnant of a mainly original inundation-forest at the lower Solimões River (Fig. 7; comp. DUCKE et al. 1954, IRMLER 1975, 1977, PIRES 1973; PRANCE 1975, 1979; SIOLI 1968; TAKEUCHI 1962). The Várzea differs from the Igapó and Terra firme forest in showing a less dense forest structure (900 - 1400 trees/ha). Dominant in the study area were *Pseudobombax munguba* (about 45 %) and *Tabebuia insignis*, as well as *T. barbata* (about 25 %); *Cecropia* spp. (about 10 %) and 11 more species (Table 3) were found subdominant.

Table 3: Flora in the study area on Curarí Island; (presence of frequent tree families in %).

trees

ANNONACEAE
1 *Guatteria chrysopetala* (Steud.) Miq.

AQUIFOLIACEAE
2 *Ilex* sp.

ARALIACEAE
3 *Didimopanax* sp.

BIGONIACEAE (ca. 25 %)
4 *Tabebuia insignis* (Miq.) Sandw.
5 *Tabebuia barbata* (E. Mey.) Sandw.

BOMBACACEAE (ca. 45 %)
6 *Pseudobombax munguba* Mart. et Zucc. Dugand.

CAPPARIDACEAE
7 *Crateva benthamii* Eichl.

FLACOURTACEAE
8 *Laetia procera* (Poepp.) Eichl.

LEGUMINOSAE
Caesalpiniaceae
9 *Macrolobium acaciaefolium* Benth
Mimosaceae
10 *Inga* sp.

MALPHIGIACEAE
11 *Byrsonima amazonica* Griseb.

MORACEAE (ca. 15 %)
12 *Cecropia* sp.
13 *Ficus* sp.

RUTACEAE
14 *Fagara compacta* (Huber) *Albuquerque*

VERBENACEAE
15 *Aegiphila aff. membranaceae* Turez

shrubs

APOCYNACEAE
1 *Tabernaemontana sananho* Ruiz et Pav.

MELASTOMATACEAE
2 *Miconia aff. ceramicarpa* (DC.) Cogn.

NYCTAGINACEAE
3 *Neea* sp.

vines

LEGUMINOSAE
Fabaceae
1 *Dioclea* sp.

MENISPERMACEAE
2 *Cissampelos andromorpha* D. C.

Table 4: Air temperature (T) and relative humidity (Rf) from 22.1. - 11.3.1976 on Curarí Island (RS) and at Tarumã Mirím River (TM). Measurements in the forest stand 3 cm above soil.

	air temperature (°C)			humidity (%)	
1976	RS	TM		RS	TM
22.1. - 29.1.	26,3	24,5		96,4	97,8
30.1. - 5.2.	26,5	24,5		91,0	97,2
6.2. - 12.1.	27,1	24,4		84,8	96,2
13.2. - 19.2.	26,8	25,1		90,7	94,6
20.2. - 26.2.	24,8	23,5		94,2	98,8
27.2. - 4.3.	26,4	24,6		92,5	95,9
5.3. - 11.3.	25,5	24,2		95,0	98,3
$\bar{T}$	26,2	24,4	$\bar{Rf}$	92,1	97,0
min.	22,0	22,0	min.	45,0	75,0
max.	37,0	29,0	max.	100	100

On the experimental area (120 x 120 m; comp. Fig. 6, 7), 29 trees could be found with a trunk circumference ⩾ 150 cm (measured at breast height). Ramification started on the average at about 10 m height (maximal tree height: 28 m). Thin trees (trunk circumference ⩽ 30 cm) were less abundant. Tops of high trees only came together here and there. Epiphytes were rare. The slightly developed shrub strata (area covering about 5 %) consisted of three species (comp. Table 3). The herb strata only reached an area covering of 5 - 10 % as well. It consisted mainly of grasses, which were partially covered by river sediments and withered when the sediments dried up. Vines were found sporadically on trees and shrubs. The relative luminous intensity on the forest floor was 20 % (comparative values in the open air, overcast sky, at about 1 p. m.). During the submersion phase floating meadows and driftwood floated with the current into the inner forest (comp. FITTKAU 1976; JUNK 1970, 1973). At the beginning of the submersion phase (April/May) almost all trees lost their leaves. The strong current carried the litter out of the forest. Only small quantities of litter were covered by river sediments. In June/July the time of flowering occurred. Leaf buds swelled. From August until October (end of submersion and beginning of emersion phase respectively) fruits dropped. They partially drifted with the decreasing water out of the forest. At the beginning of the emersion phase no litter was laying on the forest floor. Within the following 5 months a scanty litter layer was formed. According to IRMLER (1975) the amount of litter reached about 3,6 t/ha (dry weight).

Fig. 7: Experimental area on Curarí Island (Várzea) at the beginning of the emersion phase (September 1976; partial view). Arboreal photo-eclectors for determination of downward migrations and trunk approaches at *Pseudobombax munguba* (fore- and background respectively).

c) Climate

Maximum air temperature (3 cm above the forest floor) was higher on Curarí Island than at the Tarumã Mirím River (Table 4; measuring instruments, p. 97). The day/night variations reached 13 °C maximally. The relative humidity with a mean of 92,1 % was lower than in the Igapó. The day/night variations ranged between 46 and 100 % rel. humidity.

d) Water-level fluctuations

The water-level of the Solimões River fluctuates during the year. According to REISS (1976), water-levels of the Negro River near Manaus also are relevant for the lower Solimões River.

During the study period (Jan. - Dec. 1976) the study area was inundated once:
emersion phase 1975/76: until March 18, 1976
submersion phase 1976: until August 16, 1976 (= 5 months)
emersion phase 1976/77: from August 23, 1976

The high water flooded the experimental area (comp. Fig. 6) up to 3,70 m above ground level. The surface current reached 0,58 m/s (comp. SIOLI 1968).

2.2. Methods

On both experimental areas, the following capture devices were set up:
– ground photo-eclectors and arboreal photo-eclectors (FUNKE 1971)
– pitfall traps (BARBER 1931; comp. ADIS 1979; WEIDEMANN 1971).

As killing-preserving agent aqueous picric-acid solution without detergent was used (1 part saturated picric-acid solution to 3 parts of water). In field and laboratory experiments, this preservative solution turned out to be mostly neutral in terms of attraction/repellent in temperate zones (FUNKE unpubl., see ADIS 1976, 1979; ADIS and KRAMER 1975).

a) Arboreal photo-eclectors

Upward migrations and trunk approach

Arboreal photo-eclectors of FUNKE (1971) detect upward migrations of flying and non-flying animals and approaches of flying arthropods to trunks (= trunk approach). Four or five capturing funnels of black cloth, each with a collecting box at the top, were connected and formed a closed ring at 3,60 m height around the trunk (Fig. see ADIS 1977a). The collecting box was newly constructed (Fig. 8): outer wall and lid were made out of transparent plastic material (P. V. C.), bottom plate and inner tube consisted of grey P. V. C.-material (Trovidur). A metal fork, mounted on a wooden stick and manipulated from the forest floor or from a canoe, was used to take off the boxes. For this purpose, the prongs were put diagonally through two opposite laying guide holes in the bottom plate (Fig. 8b). The preservative solution of the boxes, containing the captured material, was changed at intervals or 8 or 14 days.

Downward migration and trunk approach

Modified arboreal photo-eclectors were used to detect downward migrations and trunk approaches: 4 or 5 capturing funnels of black cloth - with the opening facing the canopy and each with a collecting box at the funnel mouth - were connected forming a closed ring at 3,60 m height around the trunk (Fig. 9). The inner side of the funnel mouth and the upper rim were coated with a black adhesive plastic foil ("d-c-fix" tape, width 21 cm). The outer funnel rim was held by a wire, which was attached to the trunk. Lid socket and cloth funnel were secured to a supporting ring on the trunk (Fig. 9). Outer wall and lid of the collecting box (Fig. 10) were made out of transparent plastic material (P. V. C.), bottom plate, inner and upper tube consisted of grey plastic material (Trovidur). The collecting container was attached to the lid by means of a bayonet joint. The inner tube of the container was widened at the top. Its inner wall was coated with a mixture of grey paint and sand, like the inner wall of the collecting box mentioned above (Fig. 8). The tube center contained a locking ring (P. V. C.) with plastic gauze (mesh size 250 μ). Captured animals climbed up on the rough tube wall from this point and fell into the preservative solution. During downpours, the rainwater, running down the trunk, passed the collecting box. Animals of the upper trunk and canopy region were retained by the gauze. The above-mentioned metal fork was used to take off the collecting boxes (comp. Fig. 9c). Replacement of the preservative solution, which contained the captured material, was executed every 8 or 14 days.

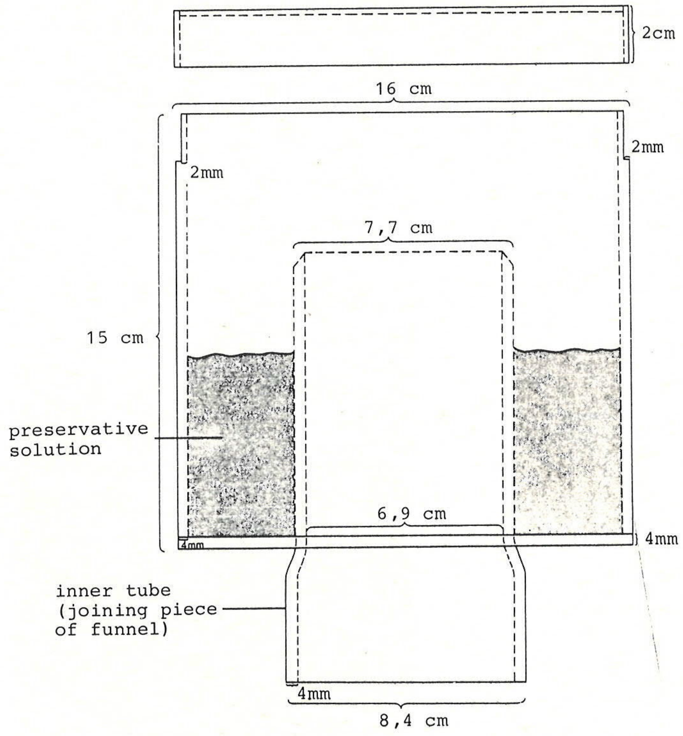
b) Ground photo-eclectors

Round capture devices with a basal area of 1 m^2, a roof of black cloth, a transparent collecting box and a pitfall trap were used (FUNKE 1971, 1977a). The lateral walls consisted of grey P. V. C.-material (Trovidur). The tools were set up in a line with 1/2 m distance to each other (Fig. see ADIS 1977a). Every 5 weeks they were moved to new locations. The picric-acid solution of collecting boxes and pitfall traps was changed weekly.

c) Pitfall traps

Round wide-necked bottles (polyethylene) with a constricted entrance served as pitfall traps (capacity 1 l, height 20 cm, aperture diameter 5,6 cm; comp. BARBER 1931).

All traps were put into plastic pipes (Trovidur), which were inserted into the substrate (see FUNKE 1971). The traps were set up in a line with 2 m distance to each other. They were covered with a transparent hard-plastic disc (20 x 20 cm), which was painted with a mixture of colourless mat paint and sand (see ADIS 1976, 1979). The catches were collected every 8 or 14 days.



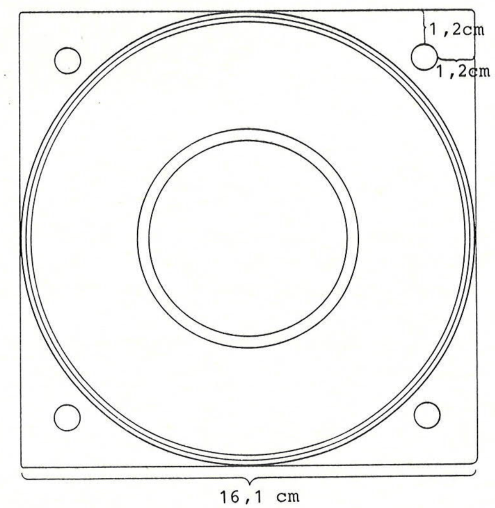
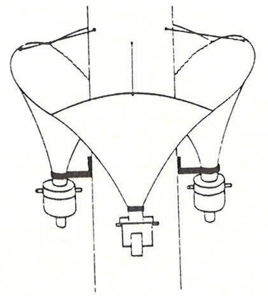
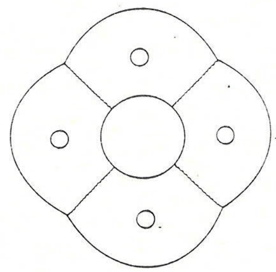


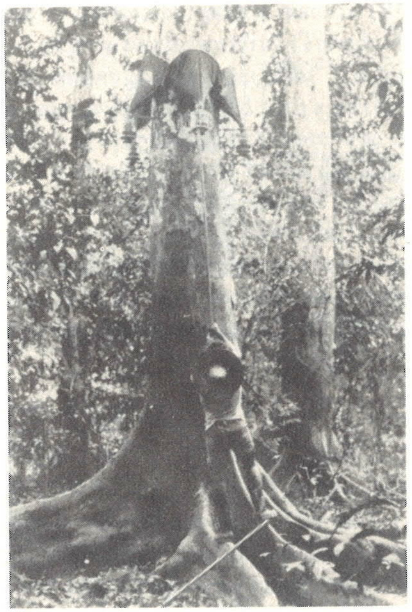
Fig. 8: Top box of arboreal photo-eclectors for determination of upward migrations and trunk approaches (from FUNKE 1971, modified).
a) collecting box with lid (side-view);
b) collecting box with lid (view from above);
bottom plate with guide holes;
explanation, see text.



9a



9b



9c

Fig. 9: Arboreal photo-eclector for determination of downward migrations and trunk approaches.
a) side-view (4 capturing funnels on a trunk);
b) view from below (cross-section of trunk, 4 capturing funnels; 4 collecting boxes (= small circles));
c) arboreal photo-eclectors at *Aldina latifolia* on the experimental area at Tarumã Mirím River (Igapó);

details, see text.

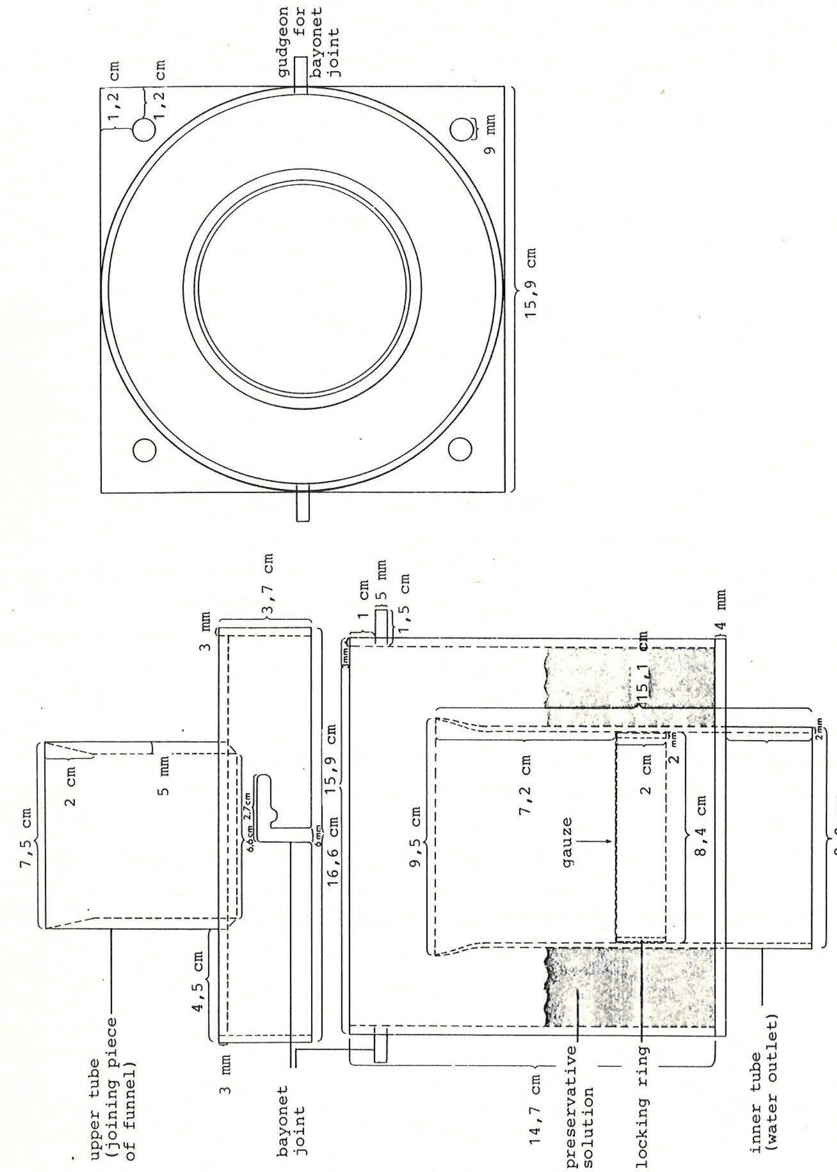


Fig. 10: Collecting container of arboreal photo-eclectors for determination of downward migrations and trunk approaches (comp. Fig. 9).
a) collecting box (side view) with lid (90 ° turned);
b) collecting box with lid (view from above); bottom plate with guide holes;
explanation, see text.

2.2.1. Tarumã Mirím River

Three arboreal photo-eclectors for upward migrations and trunk approaches (BE ↑) were set up from January 1976 - May 1977 on the experimental area. Three arboreal photo-eclectors for downward migrations and trunk approaches (BE ↓) were installed between July 1976 and May 1977. In addition, 4 and 8 ground photo-eclectors (E) respectively and 7 pitall traps (BoF) were used during the emersion phase 1975/76 and 1976/77.

The arboreal photo-eclectors were mounted on the following tree species:

tree species	type of eclector	trunk circumference (at breast height)
Aldina latifolia:	2 BE ↑ (4/5 capturing funnels)	219 cm / 240 cm
	2 BE ↓ (4 capturing funnels each)	250 cm / 290 cm
Mora paraensis:	1 BE ↓ (5 capturing funnels)	230 cm
Peltogyne venosa:	1 BE ↑ (4 capturing funnels)	190 cm

All trees (height 25 - 35 m) were buttressed. Their distance to each other was 10 - 30 m. Their distance to the river bank was 80 m during the emersion phase.

All captures of the above-mentioned arboreal photo-eclector have been evaluated. From the catches on the forest floor, the entire material has been studied from two pitfall traps and one ground photo-eclector (Dec. 75 - March 76), as well as from two pitfall traps and five ground photo-eclectors (Sept. 76 - April 77).

2.2.2. Curarí Island

On the experimental area were installed: 3 arboreal photo-eclectors for upward migrations and trunk approaches (BE ↑ ; January - December 1976) and 3 arboreal ground photo-eclectors for downward migrations and trunk approaches (3 BE ↓; July - Dec. 1976). In addition, 4 ground photo-eclectors (E) and 7 pitfall traps were set up during the emersion phase 1975/76.

The arboreal photo-eclectors were mounted on two tree species:

tree species	type of eclector		trunk circumference (at breast height)
Pseudobombax munguba:	2 BE ↑	(4/5 capturing funnels)	210 cm / 270 cm
	2 BE ↓	(4 capturing funnels each)	210 cm / 230 cm
Ficus sp.:	1 BE ↑ / 1 BE ↓	(4 capturing funnels each)	170 cm / 220 cm

The trees (height 20 - 27 m) were not buttressed. Their distance to each other was 10 - 30 m. During the emersion phase they were about 100 m distant from the river bank.

For this study, all captures of arboreal photo-eclectors (see above) and pitfall traps (Dec. 75 - March 76) were evaluated. From the end of June until the middle of July the arboreal photo-eclectors for upward migrations were flooded. From captures of the ground photo-eclector, the entire material of one eclector was studied.

2.3. Animal material

The material evaluated was classified in groups, in some cases to family. A more detailed taxonomic study is being carried out at present in close collaboration with specialists. However, the description and revision of species, genera and families will still require several years. For Pseudoscorpiones, Meinertellidae and Formicoidea, final results to species level are already available.

I heartily thank the following taxonomists for sacrificing their time while studying my material:
Dr. W. Heyer, Washington (Anura) – in collaboration with
Dr. W.E. Duellman, Lawrence – Kansas (Hylidae);
Dr. R.L. Hoffman, Radford – Virginia (Diplopoda),
Prof. Dr. W. Kempf †, Brasilia (Formicoidea) – in collaboration with
Prof. Dr. W. Brown, Ithaca – New York and G. Diniz, Brasilia;
Dr. V. Mahnert, Genf (Pseudoscorpiones);
Dr. G. Righi, São Paulo (Oligochaeta);
Dr. U. Scheller, Storfors (Symphyla);
Dr. P. Vanzolini, São Paulo (Sauria: Iguanidae, Teiidae, Scincidae),
Dr. P. Wygodzinsky, New York (Meinertellidae).

Diptera from the forest floor have been completely evaluated; Diptera of the trunk have only been evaluated for January - May 1976/77. Acari, Collembola and Thysanoptera remain unconsidered.

2.3.1. Tarumã Mirím River

About 207.000 arthtopods have been studied. 127.000 were caught in the trunk area (46 % Insecta – mostly Holometabola –, 32 % Arachnida, 22 % Isopoda and Myriapoda), 80.000 on the forest floor (90 % Insecta – mostly Holometabola –, 9 % Arachnida, 1 % Isopoda and Myriapoda).

2.3.2. Curarí Island

About 47.000 arthropods have been evaluated. 45.000 were caught in the trunk area (94 % Insecta – mostly Holometabola –, 5,7 % Arachnida, 0,3 % Isopoda and Myriapoda), 2.000 on the forest floor (91,1 % Insecta – mostly Holometabola – 8,3 % Araneae, 0,6 % Myriapoda).

3. Results

3.1. Trunk migration (upwards/downwards) and trunk approach*

Arboreal photo-eclectors detect animals of the trunk and canopy region, inhabitants of small habitats, animals from the ground, as well as immigrants and animals passing through from adjacent biotopes. Arboreal photo-eclectors provide valuable data on activity periods and life cycles (FUNKE 1971). In neotropical inundation-forests, they indicate vertical migrations under the influence of rainy and dry season.

3.1.1. Tarumã Mirím River

3.1.1.1. Group spectrum and dominance

Between January 1976 and May 1977 – the above-mentioned groups disregarded – 126.891 arthropods were caught (Table 5): 74.152 during upward migrations and trunk approaches, 52.739 during downward migrations and trunk approaches. The highest dominance of the total catch was recorded for Fomicoidea (31,4 %), Pseudoscorpiones (16,4 %), Araneae (14,5 %) and Diplopoda (10,6 %). Symphyla (4,6 %), Coleoptera (4,3 %) and Chilopoda (3,9 %) followed. Less dominant have been Isopoda (3,4 %), nymphs of Cicadina ** (2,7 %) and Isoptera (1,1 %). "Other" arthropods (comp. Table 5) include Diplura (15 Japygidae), Odonata (11 imagines of Zygoptera), Neuroptera and Trichoptera (9 larvae and imagines each), furthermore 5 Scorpiones and 2 Emphemeroptera (imagines). Other animal groups that occurred were: 120 Gastropoda (snails with shells), and 9 Iguanidae, besides some Nematoda, Oligochaeta and terrestrial planaria (Tricladida). Pseudoscorpiones, Formicoidea and Meinertellidae are evaluated in detail subsequently.

Concerning the groups listed in Table 5, we are dealing within the:

Opiliones mainly with Laniatores (*Cosmetus* sp.),

Chilopoda mainly with Geophilomorpha (about 95 %), partly with Scolopendromorpha and few Lithobiomorpha (1 n. sp.),

Diplopoda with

"Juliformia" – particularly Spirostreptida (Pseudonannolenidae: *Epinannolene* n. sp.),

Colobognatha – several species (*Siphonophora* sp.),

"others" – mainly Polydesmida (particularly Pyrogdesmidae, some Paradoxomatidae), few "Nematophora" (Stemmiulidae, 3 n. sp.),

Symphyla mainly with 1 n. sp. (Scutigerellidae: *Hanseniella arborea* SCHELLER 1979.

* Flying arthropods which are caught after arriving at trunks for different reasons.

** Cicadoidea and Fulgoroidea of BORROR et al. 1976

3.1.1.2. Trunk migration (upwards/downwards) and trunk approach (= density activity) throughout the year

With the beginning of the rainy season, numerous arthropods – especially Arachnida and Myriapoda – migrated into the trunk and canopy region (Table 5). Symphyla, Polyxenidae, Pseudoscorpiones, Chilopoda, and large spiders have been particularly frequent on the trunk 4 - 6 weeks before the experimental area was flooded (1976 and 1977). Presumably, these animals have been directly stimulated to migration by increasing wetness and rel. humidity on the forest floor (comp. Fig. 12, Fig. 14). However, wood-lice and small spiders escaped to the trunk area only upon high wetness of the soil, just before inundation (Fig. 13, comp. ADIS 1977a). At this time some few Japygidae and large bird spiders (*Acanthoscuria* sp.) occurred in arboreal photo-eclectors, as well as Gastropoda, Oligochaeta and terrestrial planaria. Some animals (e. g. Chilopoda, Pseudoscorpiones, Polyxenidae) have still been caught after the high water had already reached the lower rim of the funnel (mid May 1976). The dominance of animal groups during upward migrations was different from January - May 1976 compared to January - May 1977 (Table 6). Pseudoscorpiones, Isopoda and Uropygi for example were more frequently caught in 1976, whereas Diplopoda and Symphyla were more numerous in 1977.

During the submersion phase some few imagines of aquatic living larvae occurred in arboreal photo-eclectors, e. g. Odonata and Trichoptera. Large Pisauridae (*Ancylometes gigas**, body length about 40 mm) hunted on the water surface and at the water line (sitting on the trunk) for prey. They were caught as well, while running up and down the trunks.

At the beginning of the emersion phase, the forest floor was recolonized, particularly by terricole arthropods. Many migrated down the trunk, some, e. g. Pseudoscorpiones and small Araneae, already before the end of the submersion phase (Table 5). Some groups occurred more frequently when compared to their upward migrations on the trunk (see Diplopoda, Chilopoda, Isoptera, Opiliones, Uropygi).

During the **dry season** of the emersion phase, mainly pterygote insects dominated on the trunk, e.g. imagines of Blattodea, Heteroptera, Cicadina and Lepidoptera (mostly "microlepidaptera") as well as Coleoptera (esp. Curculionidae). Bark breeding Platypodidae and Scolytidae (mostly *Xyleborus* sp.) occurred. Ants, in particular arboricole species, migrated in large numbers between canopy and forest floor along the trunk. Migrations took place especially at high air temperatures on the ground and at low humidity of soil and air (comp. Fig. 11). At this time Saltatoria, mostly nymphs of Grylloidea and Tettigonoidea (about 75 % and 15 % of the total catch) migrated up the trunks as well.

With the beginning of the **rainy season**, the number of pterygote insects on the trunks decreased. Imagines became less numerous, larvae – especially of Cicadina – occurred more frequently (comp. Table 5). Terricole arthropods migrated in large numbers up the trunks.

* Synonym of *Lycoctenus gigas* Pickard-Cambridge 1897, (Ctenidae).

Table 5: **Trunk (upwards/downwards) and trunk approach TM (activity density)**$^{+}$
monthly captures ↑ upward migration (trunk approach): Jan. 1976 - May 1977 (3 BE);
↓ downward migration (trunk approach): July 1976 - May 1977 (3 BE);
tendency ↑ : ↓ (↑, ↓ = χ^2 sign. for $p < 0.01$ (↑), (↓) = χ^2 sign. for $p > 0.05$).

		1976 rainy season emersion phase				1976 dry season submersion phase								1977 rainy season emersion phase								
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%ΣΣ
1 Formicoidea	↑	1829	1568	1805	155	95	47	63	221	3931	4092	3759	2128	1576	1816	1831	1424	135	26475			
	↓							1464	1986	974	2431	3629	151	147	297	179	1602	506		13366	39841	31,40
	Tend.	-	-	-	-	-	-	↓	↓	↑	↑	–	↑	↑	↑	↑	↓	↓				
2 Pseudoscorpiones	↑	194	1770	5097	251	642	363	9	13	39	14	16	26	69	443	1146	938	26	11260			
	↓							756	4748	3699	23	23	12	34	208	156	76	21		9484	20744	16.40
	Tend.	-	-	-	-	-	-	↓	↓	↓	–	–	(↑)	↑	↑	↑	↑	–				
3 Araneae < 5 mm	↑	137	223	4800	402	316	112	48	52	176	202	98	70	119	359	967	3359	252	11692			
	↓							938	1187	622	38	33	25	26	146	822	947	141		4925	16617	13.10
	Tend.	-	-	-	-	-	-	↓	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑				
4 Diplopoda	↑	145	69	198	233	48	115	8	13	59	36	223	139	85	319	257	445	123	2515			
	↓							1643	1522	5842	701	355	215	74	226	136	146	141		11001	13516	10.65
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	↓	↓	–	↑	↑	↑	–				
5 Symphyla	↑	4	146	688	30	14	6	1	-	5	-	-	-	1	340	1478	862	46	3621			
	↓							16	30	1119	10	-	-	6	66	562	373	15		2197	5818	4,58
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	–	–	–	↑	↑	↑	↑				
6 Coleoptera ad	↑	102	47	49	14	14	58	33	30	310	771	481	428	142	86	51	43	37	2696			
	↓							384	332	537	127	150	176	152	215	298	255	83		2709	5405	4,26
	Tend.	-	-	-	-	-	-	↓	↓	↓	↑	↑	↑	-	↓	↓	↓	↓				
7 Chilopoda	↑	76	95	659	46	100	75	4	4	37	-	2	4	39	292	368	300	30	2131			
	↓							156	570	1977	11	-	13	8	80	31	13	10		2869	5000	3,94
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	-	(↓)	↑	↑	↑	↑	↑				
8 Isopoda	↑	-	1	1404	93	3	3	1	-	1	-	-	-	2	-	2	1177	112	2799			
	↓							38	7	3	2	2	-	1	1	2	771	649		1476	4275	3,37
	Tend.	-	-	-	-	-	-	↓	↓	-	-	-	-	-	-	-	↑	↓				

Table 5: – continuation –

		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%ΣΣ
9 Cicadina lv	↑	231	265	495	22	10	1	3	14	127	461	276	239	132	262	531	303	11	3383			
	↓							-	1	-	4	1	-	1	-	1	-	-		8	3391	2,67
	Tend.	-	-	-	-	-	-	-	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑				
10 Araneae > 5 mm	↑	68	104	244	29	35	12	22	46	132	139	120	63	46	70	70	124	28	1352			
	↓							19	37	66	49	41	27	17	33	35	102	23		449	1801	1,42
	Tend,	-	-	-	-	-	-	-	-	↑	↑	↑	↑	↑	↑	↑	-	-				
11 Isoptera	↑	-	1	1	-	1	-	3	-	6	8	4	3	10	-	-	6	5	48			
	↓							53	974	27	20	9	27	17	2	85	34	76		1324	1372	1,08
	Tend.	-	-	-	-	-	-	↓	↓	↓	(↓)	-	↓	-	-	↓	↓	↓				
12 Psocoptera	↑	54	17	20	35	14	7	2	15	448	209	63	28	35	70	65	40	5	1127			
	↓							14	13	30	3	3	4	3	8	27	6	3		114	1241	0,98
	Tend.	-	-	-	-	-	-	↓	-	-	↑	↑	↑	↑	↑	↑	↑	-				
13 Saltatoria	↑	136	93	103	14	5	2	2	9	114	153	150	91	38	70	89	88	11	1168			
	↓							2	4	7	3	2	8	2	3	8	8	7		54	1222	0,96
	Tend.	-	-	-	-	-	-	-	-	↑	↑	↑	↑	↑	↑	↑	↑	-				
14 Blattodea lv	↑	68	60	250	28	11	11	1	2	43	119	66	39	41	29	21	166	13	968			
	↓							6	4	16	15	17	6	1	7	11	41	16		140	1108	0,87
	Tend.	-	-	-	-	-	-	-	-	↑	↑	↑	↑	↑	↑	(↑)	↑	-				
15 Opiliones	↑	3	1	5	13	-	-	1	4	-	3	1	-	1	-	-	10	4	46			
	↓							492	259	24	4	2	2	5	8	5	20	16		837	883	0,70
	Tend.	-	-	-	-	-	-	↓	↓	↓	-	-	-	↓	↓	↓	-	↓				
16 Hymenoptera *	↑	71	42	95	4	3	5	-	9	70	67	62	67	51	40	26	52	14	678			
	↓							32	12	29	3	6	4	2	3	6	4	4		105	783	0,62
	Tend.	-	-	-	-	-	-	↓	-	↑	↑	↑	↑	↑	↑	↑	↑	(↑)				
17 Heteroptera lv	↑	17	11	23	3	2	3	1	5	64	89	87	57	36	30	77	48	2	555			
	↓							7	6	4	3	-	-	-	2	-	1	3		26	581	0,46
	Tend.	-	-	-	-	-	-	(↓)	-	↑	↑	↑	↑	↑	↑	↑	↑	-				
18 Uropygi	↑	12	6	47	-	-	1	1	1	17	-	-	-	1	7	8	11	-	112			
	↓							3	22	303	6	1	-	-	7	6	3	-		351	463	0,36
	Tend.	-	-	-	-	-	-	-	↓	↓	(↑)	-	-	-	-	-	(↑)	-				
19 Meinertellidae	↑	23	29	31	-	-	-	-	-	-	130	63	11	2	2	-	9	-	300			
	↓							1	-	11	79	30	10	-	-	-	-	-		131	431	0,34
	Tend.	-	-	-	-	-	-	-	-	↓	↑	↑	-	-	-	-	↑	-				

Table 5: – continuation –

		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%ΣΣ
20 Mantodea	↑	31	15	42	8	2	-	1	2	49	49	26	18	18	32	75	23	4	395			
	↓							1	2	-	-	-	1	-	1	-	1	1		7	402	0,32
	Tend.	-	-	-	-	-	-	-	-	↑	↑	↑	↑	↑	↑	↑	↑	-				
21 Coleoptera lv.	↑	17	-	29	-	-	-	-	-	4	12	29	9	1	1	3	10	4	119			
	↓							40	48	58	12	5	14	11	9	18	10	4		219	338	0,27
	Tend.	-	-	-	-	-	-	↓	↓	↓	-	↑	-	↓	(↓)	↓	-	-				
22 Lepidoptera ad.	↑	-	6	8	-	5	-	7	4	23	21	6	6	3	4	10	47	3	153			
	↓							3	11	30	13	4	3	11	12	12	6	2		107	260	0,21
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-	(↓)	(↓)	-	↑	-				
23 Diptera lv	↑	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	11	15			
	↓							-	-	25	7	4	22	17	9	85	58	1		228	243	0,19
	Tend.	-	-	-	-	-	-	-	-	↓	↓	(↓)	↓	↓	↓	↓	↓	↑				
24 Heteroptera ad	↑	3	-	7	1	2	2	1	1	42	44	4	13	8	1	8	4	3	144			
	↓							12	11	33	3	5	4	3	5	5	4	3		88	232	0,18
	Tend.	-	-	-	-	-	-	↓	↓	-	↑	-	↑	-	-	-	-	-				
25 Lepidoptera lv.	↑	22	8	6	1	-	-	1	-	4	18	16	18	8	8	10	10	1	131			
	↓							3	14	23	12	9	6	-	1	15	3	10		96	227	0,18
	Tend.	-	-	-	-	-	-	-	↓	↓	-	-	(↑)	↑	↑	-	-	↓				
26 Cicadina ad.	↑	10	8	8	2	5	1	3	3	4	15	7	16	5	8	6	6	2	109			
	↓							6	9	6	1	-	1	-	1	1	1	-		26	135	0,11
	Tend.	-	-	-	-	-	-	-	-	-	↑	↑	↑	(↑)	(↑)	-	-	-				
27 Blattodea ad.	↑	4	3	9	2	-	1	3	18	22	1	5	6	2	1	1	9	-	87			
	↓							1	19	12	1	1	1	1	1	5	2	-		44	131	0,10
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(↑)	-				
28 Embioptera	↑	5	5	12	3	2	-	-	-	9	15	18	8	2	-	-	-	1	80			
	↓							3	19	5	1	9	-	-	1	-	-	-		38	118	0,09
	Tend.	-	-	-	-	-	-	-	↓	-	↑	-	↑	-	-	-	-	-				
29 Aphidoidea	↑	2	7	2	-	-	-	-	-	-	41	17	9	-	6	5	2	-	91			
	↓							2	-	1	1	-	-	-	-	-	-	-		4	95	0,07
	Tend.	-	-	-	-	-	-	-	-	-	↑	↑	↑	-	(↑)	(↑)	-	-				
30 Dermaptera	↑	-	-	1	2	-	-	-	-	-	-	-	3	-	13	5	3	2	29			
	↓							4	2	-	-	-	-	-	-	2	-	-		8	37	0,03
	Tend.	-	-	-	-	-	-	(↓)	-	-	-	-	-	-	-	-	-	-				

Table 5: – continuation –

		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%ΣΣ
31 Nicoletiidae	↑	3	-	-	-	-	-	-	-	-	-	2	1	-	1	-	-	-	7			
(Zygentoma)	↓							-	5	11	2	6	2	-	2	-	-	-		28	35	0,03
	Tend.	-	-	-	-	-	-	-	(↓)	↓	-	-	-	-	-	-	-	-				
32 Phasmatodea	↑	8	6	1	-	-	-	-	-	-	-	6	1	3	1	1	-	-	27			
	↓							-	-	-	-	-	-	-	-	-	-	-		-	27	0,02
	Tend.	-	-	-	-	-	-	-	-	-	-	(↑)	-	-	-	-	-	-				
others	↑	1	1	8	-	-	3	3	4	6	3	3	-	-	-	2	6	3	43			
	↓							-	-	3	-	-	-	1	2	-	1	1		8	51	0,04
	Tend.	-	-	-	-	-	-	-	(↑)	-	-	-	-	-	-	-	-	-				
total:		3267	4607	16151	1391	1329	828	222	470	5742	6712	5610	3501	2476	4311	7113	9525	888	74152			
								6099	11854	15487	3585	4347	734	540	1356	2513	4488	1736		52739	126891	100 %
	Tend.	-	-	-	-	-	-	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↓				

Coleoptera		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%Σ	%ΣΣ
Carabidae	↑	-	-	5	3	-	1	2	-	3	1	2	3	1	4	2	3	-	30				
	↓							41	68	74	17	17	28	29	30	43	97	4		448	478	8,84	0,38
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	(↓)					
Cerambycidae	↑	1	1	-	-	1	-	-	-	4	14	20	5	-	3	1	3	1	54				
	↓							-	-	-	-	1	1	1	-	-	-	-		3	57	1,05	0,04
	Tend.	-	-	-	-	-	-	-	-	(↑)	↑	↑	-	-	-	-	-	-					
Curculionidae	↑	69	25	16	3	2	5	1	9	36	89	9	59	32	17	9	8	12	401				
	↓							7	18	70	16	19	12	7	14	11	7	10		191	592	10,95	0,47
	Tend.	-	-	-	-	-	-	(↓)	-	↓	↑	-	↑	↑	-	-	-	-					
Elateridae	↑	-	-	1	1	-	-	-	-	4	-	1	-	-	-	-	-	-	7				
	↓							2	-	5	3	3	2	-	-	-	1	-		16	23	0,43	0,02
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Platypodidae/	↑	11	6	-	-	-	-	1	-	71	362	196	129	54	17	3	2	-	852				
Scolytidae	↓							161	57	77	21	20	33	21	20	20	10	5		445	1297	24,00	1,02
	Tend.	-	-	-	-	-	-	↓	↓	-	↑	↑	↑	↑	-	↓	(↓)	(↓)					
Staphylinidae	↑	2	-	5	-	-	2	5	2	4	6	4	36	24	18	26	3	5	142				
	↓							45	30	47	7	10	24	24	60	115	65	25		452	594	10,99	0,47
	Tend.	-	-	-	-	-	-	↓	↓	↓	-	-	-	-	↓	↓	↓	↓					

Table 5: – continuation –

		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	% Σ	%ΣΣ
others	↑	19	15	22	7	11	50	24	19	188	299	249	196	31	27	10	24	19	1210				
	↓							128	159	264	63	80	76	70	91	109	75	39		1154	2364	43,74	1,86
	Tend.	-	-	-	-	-	-	↓	↓	↓	↑	↑	↑	↓	↓	↓	↓	↓					
Diplopoda																							
Colobognatha	↑						2	-	1	-	-	1	1	-	2	-	-	-	7				
	↓							69	627	311	6	3	1	-	7	-	-	-		1024	1031	7,63	0,81
	Tend.	-	-	-	-	-	-	↓	↓	↓	(↓)	-	-	-	-	-	-	-					
Juliformia	↑						-	4	11	57	34	221	135	70	50	27	10	2	621				
	↓							152	571	3072	600	274	171	54	22	28	16	3		4963	5584	41,31	4,40
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	(↓)	(↓)	-	↑	-	-	-					
Polyxenidae	↑	-	-	113	212	46	113	4	-	2	2	1	3	-	-	3	203	121	323				
	↓							8	55	334	3	-	-	-	-	-	4	13		417	1240	9,17	0,98
	Tend.	-	-	-	-	-	-	-	↓	↓	-	-	-	-	-	-	↑	↑					
others	↑	145	69	85	21	2	-	-	1	-	-	-	-	15	267	227	232	-	1064				
	↓							1414	269	2125	92	78	43	20	197	108	126	125		4597	5661	41,88	4,46
	Tend.	-	-	-	-	-	-	↓	↓	↓	↓	↓	↓	-	↑	↑	↑	↑					
Hymenoptera*																							
Apidae	↑	30	25	45	-	-	1	-	3	6	2	4	-	25	13	8	14	-	176				
	↓							23	1	18	2	1	-	1	-	-	-	-		46	222	28,35	0,17
	Tend.	-	-	-	-	-	-	↓	-	(↓)	-	-	-	↑	↑	↑	↑	-					
others	↑	41	17	50	4	3	4	-	6	64	65	58	67	26	27	18	38	14	502				
	↓							9	11	11	1	5	4	1	3	6	4	4		59	561	71,65	0,44
	Tend.	-	-	-	-	-	-		-		↑	↑	↑	↑	↑	(↑)	↑	(↑)					

* without Formicoidea; + without Diptera-imagines (comp. Table 6; p. 114).

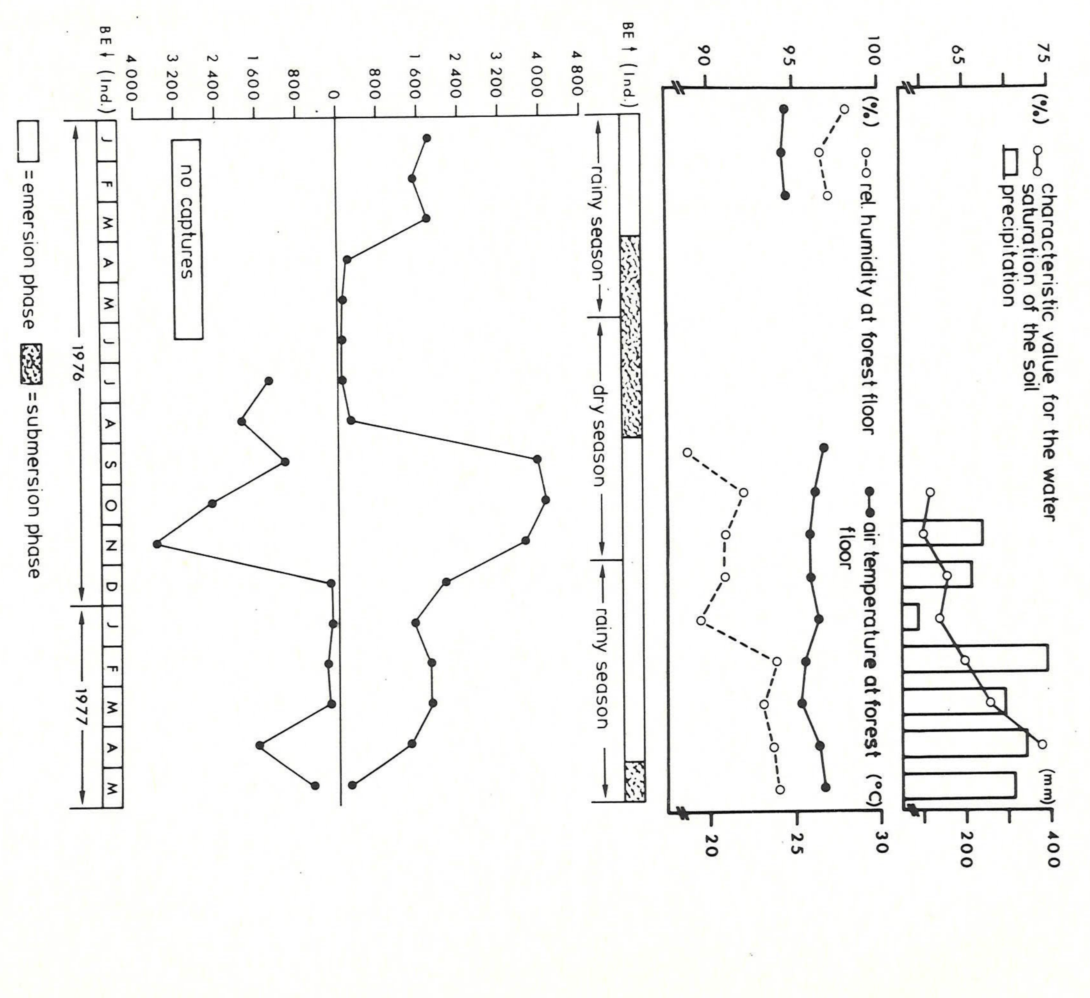


Fig. 11: Trunk migration (upwards/downwards) TM January 1976 - May 1977; 3 BE each): Formicoidea

Table 6: **Trunk migration (upwards) and trunk approach TM (activity density)**
Total captures Jan. - May 1976/77 (3 BE; Pos. = position, rank).
*mostly Cecidomyiidae; **without Formicoidea.
χ^2 - test: total captures Jan. - May 1976 : 1977
S + / S = upward migration on trunk 1976 higher/flower than 1977
(sign. for $p < 0.01$); NS = upward migrations on trunk approximately alike.

	1976				1977		
	N↑	%	Pos.	χ^2	N↑	%	Pos.
Pseudoscorpiones	7953	28,72	1	S +	2622	10,29	4
Araneae < 5 mm	5878	21,23	2	S +	5056	19,84	2
Formicoidea	5452	19,69	3	S -	6782	26,61	1
Isopoda	1501	5,42	4	S +	1293	5,07	5
Cicadina lv	1023	3,69	5	S -	1239	4,86	6
Chilopoda	976	3,53	6	NS	1029	4,04	9
Diptera*	929	3,36	7	S -	1160	4,55	8
Symphyla	882	3,19	8	S -	2727	10,70	3
Diplopoda	693	2,50	9	S -	1229	4,82	7
Araneae > 5 mm	480	1,73	10	S +	338	1,33	11
Blattodea lv	417	1,51	11	S +	270	1,06	13
Saltatoria lv	332	1,20	12	NS	284	1,11	12
Coleoptera ad	226	0,82	13	S -	359	1,41	10
Hymenoptera**	215	0,78	14	NS	183	0,72	16
Psocoptera	140	0,51	15	S -	215	0,84	14
Mantodea	98	0,35	16	S -	152	0,60	17
Meinertellidae	83	0,30	17	S +	13	0,05	24
Uropygi	65	0,23	18	S +	27	0,11	20
Heteroptera lv	56	0,20	19	S -	193	0,76	15
Coleoptera lv	46	0,17	20	S +	19	0,07	22
Lepidoptera lv	37	0,13	21	NS	37	0,14	19
Cicadina ad	33	0,12	22	NS	27	0,11	20
Embioptera	27	0,10	23	S +	3	0,01	27
Opiliones	22	0,08	24	NS	15	0,06	23
Lepidoptera ad	19	0,07	25	S -	67	0,26	18
Saltatoria ad	19	0,07	25	S +	12	0,05	25
Blattodea ad	18	0,06	26	NS	13	0,05	24
Phasmatodea	15	0,05	27	NS	5	0,02	26
Heteroptera ad	13	0,05	28	NS	24	0,09	21
Aphidoidea	11	0,04	29	NS	13	0,05	24
others	28	0,10	-	S +	83	0,32	-
total:	27687	100 %		S +	25489	100 %	

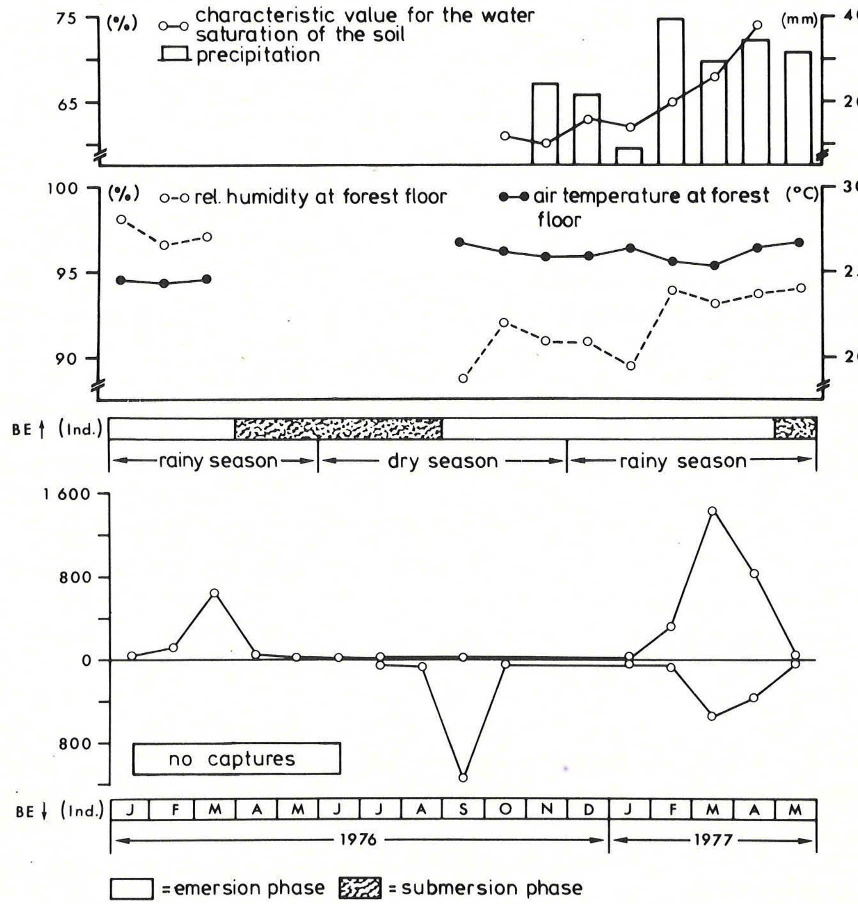


Fig. 12: Trunk migration (upwards/downwards) TM (January 1976 - May 1977; 3 BE each): Symphyla

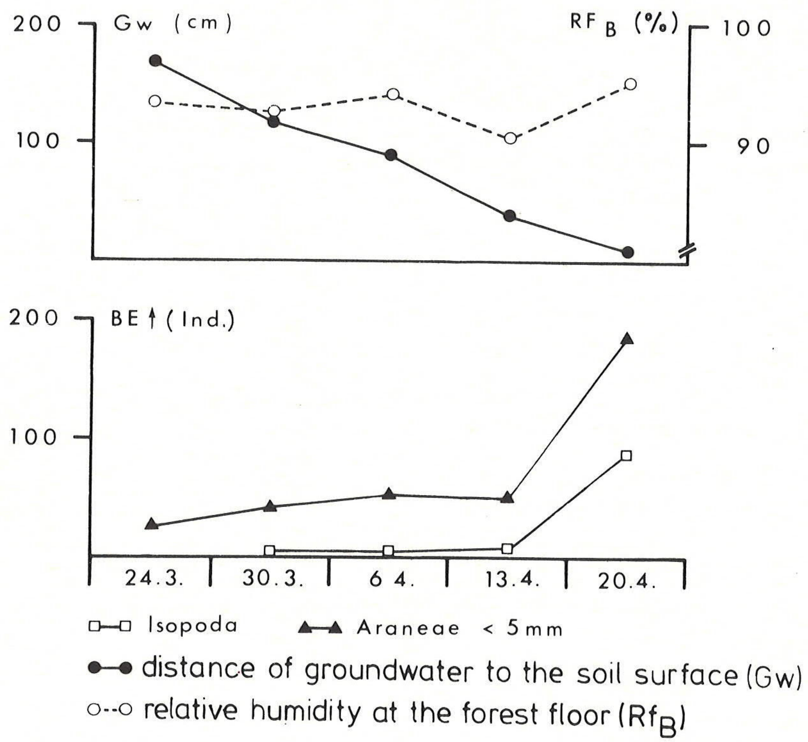


Fig. 13: Trunk migration (upwards) TM (3 BE): Isopoda, Araneae < 5 mm.
5 weekly captures before inundation of the experimental area 1977.

3.1.1.3. Activity of some species on the trunk

a) Pseudoscorpiones: Jan. 1976 - May 1977 (trunk migration – upwards/downwards)
Species spectrum and dominance

Little is known about neotropical Pseudoscorpiones. The species spectrum is still fragmentary.

Between January 1976 and May 1977 20.812 specimens were caught on the trunk: 11.056 during upward migration, 9.756 during downward migrations (Table 7). 18 species which belonged to 8 families occurred; out of these 12 were new to science (MAHNERT 1979). Twelve species occurred in the Igapó only, 6 species in Igapó and Várzea. Six species most probably were litter inhabitants, 12 species lived on bark (MAHNERT, pers. commun.). Litter inhabitants, especially *Brazilatemnus browni, Tyrannochthonius amazonicus* and *T. migrans* were very numerous (comp. Table 7).

Activity density and trunk migration (upwards/downwards) throughout the year

Litter inhabiting species migrated with the beginning of the rainy season into the trunk and canopy area(comp. Table 8, MONTGOMERY et al. 1981(. During wetness and

high rel. humidity on the forest floor, especially Chtoniidae and Miratemnidae appeared (Fig. 14). Of *Thyrannochthonius amazonicus* and *T. migrans* mostly tritonymphs migrated upwards on trunks (Fig. 16, 17, Table 9). Of *Pachyolpium irmgardae* there were mainly proto- and deutonymphs migrating and of *Brazilatemnus browni* deuto- and tritonymphs (Fig. 15, 18, Table 9). Nymphs of the latter two species remained still some considerable time in the lower trunk area after the Igapó was inundated. 1976 they were still caught in June, after the flood had already reached the capturing funnels (Fig. 15, 18). At the beginning of the emersion phase, the forest floor was recolonized, mostly by nymphs.

In addition, corticole species reappeared in the lower trunk area (Table 8). Captures of arboreal and ground photo-eclectors provided information on the life cycle of several species:

Litter inhabitants (life cycles)

Brazilatemnus browni Muchmore

B. browni was most frequently trapped (Table 7, 8). Apparently, this species is widely distributed in the Amazon region: it was recorded from the Igapó at Tarumã Mirím River, from a Terra firme forest near Manaus and from a black-water swamp-forest near Belém (MAHNERT 1979; MUCHMORE 1975).

In the Igapó, *B. browni* was already migrating from the canopy into the lower trunk area 6 weeks before the experimental area dried up (Fig. 15). Mainly tritonymphs (comp. Chtoniidae) and deutonymphs were caught (Table 9). In addition, some few protonymphs and ♀♀ occurred; ♂♂ were absent. Duration of the protonymph instar presumably lasted – equal to European species – only a few weeks (comp. GABBUTT 1967, 1969, 1970). On the forest floor almost only deuto- and tritonymphs were caught. They started to move into the trunk and canopy region 4 - 8 weeks before the experimental area was inundated (comp. Table 8, Fig. 15; about possible stimulation see Fig. 14). With the beginning of the submersion phase some few protonymphs occurred in addition to females (Fig. 15). They presumably hatched just before inundation of the forest floor. However, reproduction of *B. browni* most probably took place mainly in the upper trunk canopy region. Not until reaching this region did the nymphs moult to adults. Their descendants, particularly the tritonymphs, were three times more frequent during trunk descents compared to upward migrations in 1976 (comp. Table 8, 9).

Thyrannochthonius amazonicus MAHNERT (n. sp.)/*Tyrannochthonius migrans* MAHNERT (n. sp.)*

T. amazonicus was twice as frequent as *T. migrans* (Table 7, 8). Up to now, both species have only been recorded for the Igapó. Their reproduction most probably took place during the emersion phase on the forest floor. However, protonymphs were only caught during upward migrations on the trunk, but not on the ground (see below). Deutonymphs were rare as well (Table 24). Both nymph stages presumably lasted only a short time (comp. *B. browni*); both were free living but relatively inactive (comp. GABBUTT and VACHON 1967, 1968; WOOD 1975).

* Described by MAHNERT (1979).

With the beginning of the rainy season, tritonymphs of *T. amazonicus* occurred in large numbers on the forest floor. Apparently they represented "migratory stages", which escaped to the trunk and canopy region with increasing wetness and rel. humidity on the forest floor, especially 2 - 4 weeks before inundation of the experimental area (Fig. 14, 16, 17). During the submersion period their populations were remarkably reduced (comp. Table 9) presumably by predatory arthropods in the canopy region (JONES 1975). At the beginning of the emersion phase, the tritonymphs of both species returned to the forest floor (Fig. 16, 17) along with a few deutonymphs and adults (Table 9).

In addition, protonymphs of *T. amazonicus* were caught while migrating down the trunk. They presumably hatched in the trunk and canopy region during the submersion phase. The tritonymphs obviously moulted on the forest floor (during the dry season) to adults. Females constructed a brood chamber before laying eggs (comp. GABBUTT and VACHON 1963). For that reason, they were only occasionally captured – like ♂♂ – on the forest floor.

Pachyolpium irmgardae MAHNERT (n. sp.)*

P. irmgardae was only caught in low numbers in arboreal and ground photo-eclectors (Table 7, 8, 24). Reproduction of this species presumably took place – at least partially – during the emersion phase on the forest floor. Proto- and deutonymphs occurred from December on in ground photo-eclectors. All instars and both sexes were highly active. During the rainy season, they migrated into the trunk (canopy) region (Fig. 18). There – during the submersion phase – many of them obviously passed one or more instars. Hence compared to the upward migration, the number of deuto- and tritonymphs, ♂♂ and ♀♀ was evidently higher during the downward migration on the trunk (Table 9, Fig. 18).

Bark inhabitants

Corticole species only occurred in low numbers. For that reason, no specific statements on development and habitat preference are possible. *Dolichowithius mediofasciatus, Pachychernes baileyi* and *Americhernes bethaniae* appeared during the dry season of the emersion phase also in the lower trunk region (comp. Table 8, 9), but not on the forest floor (p. 145).

These species obviously returned to the upper trunk region with the beginning rainy season (comp. Table 8). A tree specific occurrence, as stated for Central European species (comp. KAESTNER 1969; RESSL and BEIER 1958), could not be observed. The bark of the capturing trees at Tarumã Mirím River was mostly smooth. On *Aldina latifolia* more specimens were caught when the bark partially came off the trunk and consequently offered hiding places.

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* Described by MAHNERT (1979).

Table 7: **Trunk migration (upwards/downwards) TM – Pseudoscorpiones**
(Jan. 1976 - May 1977; 3 BE each).
Dominance of species on the total catch; habitat association to biology of closely related species (MAHNERT, pers. commun.);
* = exclusively occuring at TM; new species (n. sp.) described by MAHNERT (1979).

	species	family	N↑↓	%	inhabitants of litter	/ bark
1	*Brazilatemnus browni* Muchmore*	(Miratemnidae)	8577	41,21	(x)	
2	*Tyrannochthonius amazonicus* n. sp.*	(Chtoniidae)	7611	36,57	x	
3	*Tyrannochthonius migrans* n. sp.	(Chtoniidae)	3767	18,10	x	
4	*Pachyolpium irmgardae* n. sp. *	(Olpiidae)	382	1,84	x	
5	*Geogarypus amazonicus* n. sp.*	(Garypidae)	191	0,92	x	
6	*Pachychernes baileyi* Feio	(Chernetidae)	98	0,47		x
7	*Americhernes bethaniae* n. sp.	(Chernetidae)	78	0,38		(x)
8	*Dolichowithius mediofasciatus* n. sp.	(Withiidae)	44	0,21		(x)
9	*Americhernes incertus* n. sp.*	(Chernetidae)	19	0,09	no indications	
10	*Dolichowithius minutus* n. sp.*	(Withiidae)	10	0,05		(x)
10	*Parachernes plumosus* (With)	(Chernetidae)	10	0,05		(x)
11	*Parawithius* (Victorwithius) *gracilimanus* n. sp.*	(Withiidae)	8	0,04		(x)
12	*Paratemnus minor* (Balzan)	(Atemnidae)	7	0,03		(x)
13	*Parachernes setiger* n. sp.*	(Chernetidae)	3	0,01		(x)
14	*Dolichowithius intermedius* n. sp.*	(Withiidae)	2	0,01		(x)
14	*Parachernes meinertii* (With)*	(Chernetidae)	2	0,01		(x)
14	*Parachernes melanopygus* Beier*	(Chernetidae)	2	0,01		(x)
15	*Tridenchthonius brasiliensis* n. sp. *	(Dithidae)	1	0,005	x	
		total:	20.812	100 %		

Table 8: **Trunk migration (upwards/downwards) TM – Pseudoscorpiones**
monthly captures ↑ upwards migration: Jan. 1976 - May 1977 (3 BE);
↓ downwards migration: July 1976 - May 1977 (3 BE);
tendency ↑ : ↓ (↑, ↓ = χ^2 sign. for $p < 0.01$; (↑), (↓) = χ^2 sign. for $p < 0.05$;
new species (n. sp.) described by MAHNERT (1979).

	1976 rainy season emersion phase				1976 dry season submersion phase							1977 rainy season emersion phase							
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	N↑	N↓	ΣΣ	%ΣΣ
1 Braziliatemnus ↑	-	-	918	228	595	324	4	7	9	1	-	-	-	27	116	110	3	2342			
browni Muchmore ↓							631	4504	1066	-	-	-	-	2	16	8	8		6235	8577	41,21
(Miratemnidae) Tend.	-	-	-	-	-	-	↓	↓	↓	-	-	-	-	↑	↑	↑	-				
2 Tyrannochthonius																					
amazonicus n.sp. ↑	59	1029	2308	4	1	-	-	-	11	-	-	5	55	365	780	639	3	5259			
(Chtoniidae) ↓							15	28	1921	4	-	4	31	183	103	56	7		2352	7611	36,57
Tend.	-	-	-	-	-	-	↓	↓	↓	(↓)	-	-	↑	↑	↑	↑	-				
3 Tyrannochthonius																					
migrans n.sp. ↑	128	737	1846	4	-	-	-	-	1	-	-	-	-	38	236	182	-	3172			
(Chtoniidae) ↓							28	25	482	3	-	-	1	10	35	9	2		595	3767	18,10
Tend.	-	-	-	-	-	-	↓	↓	↓	-	-	-	-	↑	↑	↑	-				
4 Pachyolpium ↑	2	3	24	12	41	24	1	2	1	1	-	1	-	3	6	5	19	145			
irmgardae n. sp. ↓							23	67	127	8	2	-	-	4	1	2	3		237	382	1,84
(Olpiidae) Tend.	-	-	-	-	-	-	↓	↓	↓	(↓)	-	-	-	-	(↑)	-	↑				
5 Geogarypus ↑	3	-	1	3	5	13	4	1	6	-	2	1	1	2	-	-	-	42			
amazonicus n. sp. ↓							31	65	33	3	8	4	-	4	1	-	-		149	191	0,92
(Garypidae) Tend.	-	-	-	-	-	-	↓	↓	↓	-	(↓)	-	-	-	-	-	-				
6 Pachychernes baileyi																					
Feio (Chernetidae) ↑	2	1	-	-	-	-	-	3	5	6	7	4	6	1	5	1	-	41			
↓							6	20	21	2	7	1	-	-	-	-	-		57	98	0,47
Tend.	-	-	-	-	-	-	(↓)	↓	↓	-	-	-	(↑)	-	(↑)	-	-				
7 Americhernes ↑	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1			
bethaniae n. sp. ↓							10	21	36	1	2	1	-	4	-	1	1		77	78	0,38
(Chernetidae) Tend.	-	-	-	-	-	-	↓	↓	↓	-	-	-	-	-	-	-	-				
8 Dolichowithius ↑	-	-	-	-	-	1	-	-	1	-	4	7	1	1	-	-	-	15			
mediofasciatus n.sp. ↓							8	11	4	1	3	1	-	1	-	-	-		29	44	0,21
(Withiidae) Tend.	-	-	-	-	-	-	↓	↓	-	-	-	↑	-	-	-	-	-				
9 Americhernes ↑	-	-	-	-	-	-	-	-	3	3	1	3	1	3	3	-	-	17			
incertus n.sp. ↓							1	-	1	-	-	-	-	-	-	-	-		2	19	0,09
(Chernetidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
10 Dolichowithius ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
minutus n. sp. ↓							1	4	3	-	-	2	-	-	-	-	-		10	10	0,05
(Withiidae) Tend.	-	-	-	-	-	-	-	(↓)	-	-	-	-	-	-	-	-	-				
10 Parachernes ↑	-	-	-	-	-	-	-	-	-	-	-	4	3	3	-	-	-	10			
plumosus (With) ↓							-	-	-	-	-	-	-	-	-	-	-		-	10	0,05
(Chernetidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	(↑)	-	-	-	-	-				
11 Parawithius ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
(Victorwithius) ↓							1	3	2	1	1	-	-	-	-	-	-		8	8	0,04
gracilimanus n.sp.																					
(Withiidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
12 Paratemnus minor																					
(Balzan) ↑	-	-	-	-	-	-	-	-	1	1	1	-	1	-	-		1	5			
(Atemnidae) ↓							-	-	1	-	-	-	1	-	-	-	-		2	7	0,03
Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
13 Parachernes ↑	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	3			
setiger n. sp. ↓							-	-	-	-	-	-	-	-	-	-	-		-	3	0,01
(Chernetidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
14 Parachernes ↑	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	2			
meinertii (With) ↓							-	-	-	-	-	-	-	-	-	-	-		-	2	0,01
(Chernetidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
14 Dolichowithius ↑	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1			
intermedius n.sp. ↓							1	-	-	-	-	-	-	-	-	-	-		1	2	0,01
(Withiidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
14 Parachernes ↑	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1			
melanopygus Beier ↓							-	-	1	-	-	-	-	-	-	-	-		1	2	0,01
(Chernetidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
15 Tridenchthonius ↑	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
brasiliensis n.sp. ↓							-	-	1	-	-	-	-	-	-	-	-		1	1	0,005
(Dithidae) Tend.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Total:																		11056	9756	20812	100 %

Table 9: **Trunk migration (upwards/downwards) TM – Pseudoscorpiones**
(Jan. 1976 - May 1977; 3 BE each). Dominance of all instars and sexes (for frequent species in %); all instars were not found for all species.
P = protonymph, D = deutonymph, T = tritonymph, ♂, ♀;
new species (n. sp.) described by MAHNERT (1979).

	species/(family)		N ↑	N ↓	% ↑	% ↓
1	*Brazilatemnus browni*	P	15	10	0,6	0,2
	Muchmore	D	119	154	5,1	2,5
	(Miratemnidae)	T	2194	6049	93,7	97,0
		♀	14	22	0,6	0,3
2	*Tyrannochthonius*	P	-	2	-	0,1
	amazonicus n. sp.	D	8	9	0,1	0,4
	(Chtoniidae)	T	5247	2338	99,8	99,4
		♂	1	2	< 0,1	0,1
		♀	3	1	0,1	< 0,1
3	*Tyrannochthonius*	D	5	3	0,2	0,5
	migrans n. sp.	T	3121	590	98,4	99,2
	(Chtoniidae)	♂	6	-	0,2	-
		♀	40	2	1,1	0,3
4	*Pachyolpium*	P	102	85	70,3	35,9
	irmgardae n. sp.	D	21	65	14,5	27,4
	(Olpiidae)	T	5	32	3,5	13,5
		♂	8	22	5,5	9,3
		♀	9	33	6,2	13,9
5	*Geogarypus*	P	1	29	2,4	19,4
	amazonicus n. sp.	D	5	25	11,9	16,8
	(Garypidae)	T	8	15	19,0	10,1
		♂	15	42	35,7	28,2
		♀	13	38	31,0	25,5
6	*Pachychernes*	P	6	33	14,6	57,9
	baileyi Feio	D	14	8	34,1	14,0
	(Chernetidae)	T	9	3	22,0	5,3
		♂	4	7	9,8	12,3
		♀	8	6	19,5	10,5
7	*Americhernes*	P	-	36	-	47,4
	bethaniae n. sp.	D	-	6	-	6,6
	(Chernetidae)	T	1	11	100,0	14,5
		♂	-	10	-	13,1
		♀	-	14	-	18,4
8	*Dolichowithius*	P	2	1	13,3	3,4
	mediofasciatus n. sp.	D	4	3	26,8	10,4
	(Withiidae)	T	5	4	33,3	13,8
		♂	2	10	13,3	34,5
		♀	2	11	13,3	37,9

	species/(family)		N	N
9	*Americhernes*	P	-	1
	incertus n. sp.	D	3	1
	(Chernetidae)	T	2	-
		♂	5	-
		♀	7	-
10	*Dolichowithius*	D	-	1
	minutus n. sp.	♂	-	4
	(Withiidae)	♀	-	5
10	*Parachernes*	D	1	-
	plumosus (With)	T	1	-
	(Chernetidae)	♂	6	-
		♀	2	-
11	*Parawithius*	P	-	1
	(Victorwithius)	D	-	2
	gracilimanus n. sp.	♂	-	3
	(Withiidae)	♀	-	2
12	*Paratemnus*	♀	5	2
	minor (Balzan)			
	(Atemnidae)			
13	*Parachernes*	♂	1	-
	setiger n. sp.	♀	2	-
	(Chernetidae)			
14	*Parachernes*	♀	2	-
	meinertii (With)			
	(Chernetidae)			
14	*Dolichowithius*	♂	-	1
	intermedius n. sp.	♀	1	-
	(Withiidae)			
14	*Parachernes*	♀	1	1
	melanopygus Beier			
	(Chernetidae)			
15	*Tridenchthonius*	♀	1	-
	brasiliensis n. sp.			
	(Dithidae)			

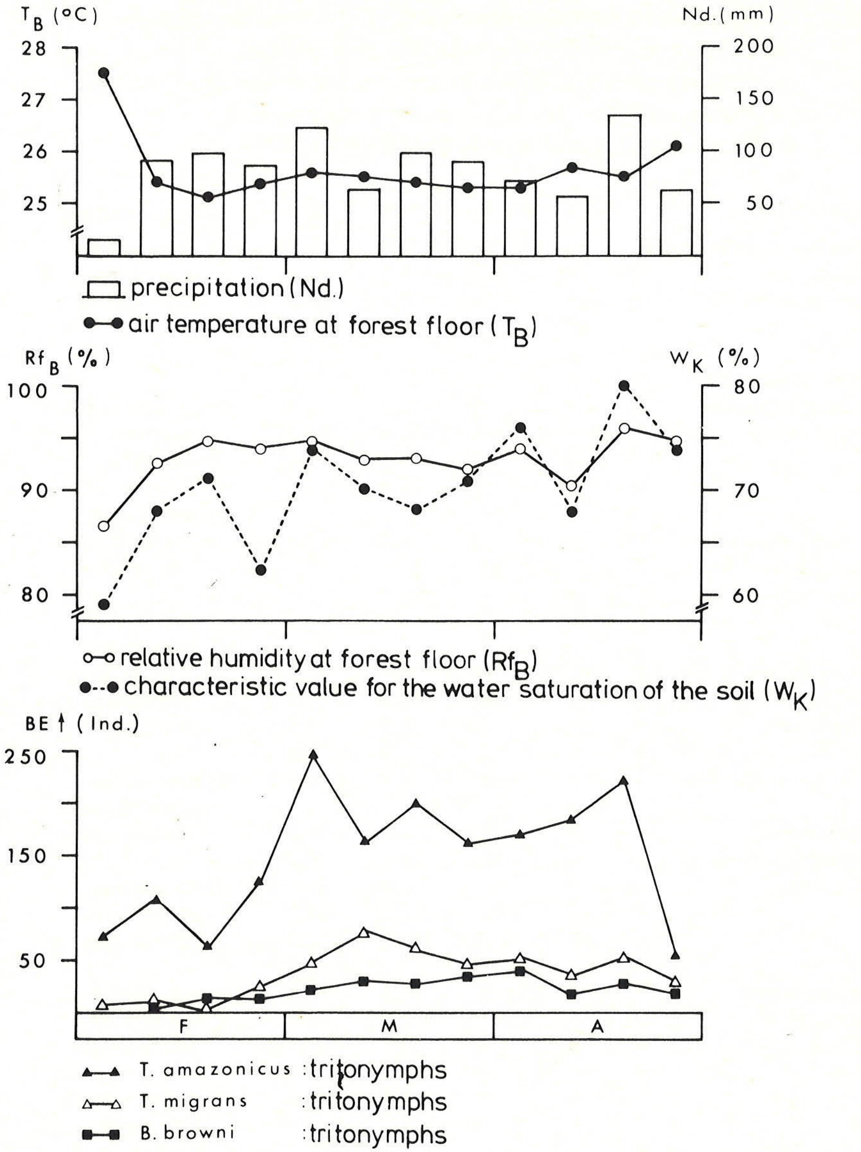

Fig. 14: Trunk migration (upwards) TM (February - April 1977; 3 BE): Tritonymphs (Pseudoscorpiones)

correlations to abiot. factors (Dec. 76 - April 77)

	r_1	r_2
T. amazonicus	+0,524*	+0,550*
T. migrans	+0,545*	+0,492
B. browni	+0,702**	+0,588*

r_1 = correlation coefficient of trunk migration (upwards) and characteristic value for the water saturation of the soil (W_K)/week.

r_2 = correlation coefficient of trunk migration (upwards) and rel humidity (Rf_B)/week.

* = significant for p = 0,05 (r > 0,497; n = 16). ** = significant for p = 0,01 (r > 0,623; n = 16).

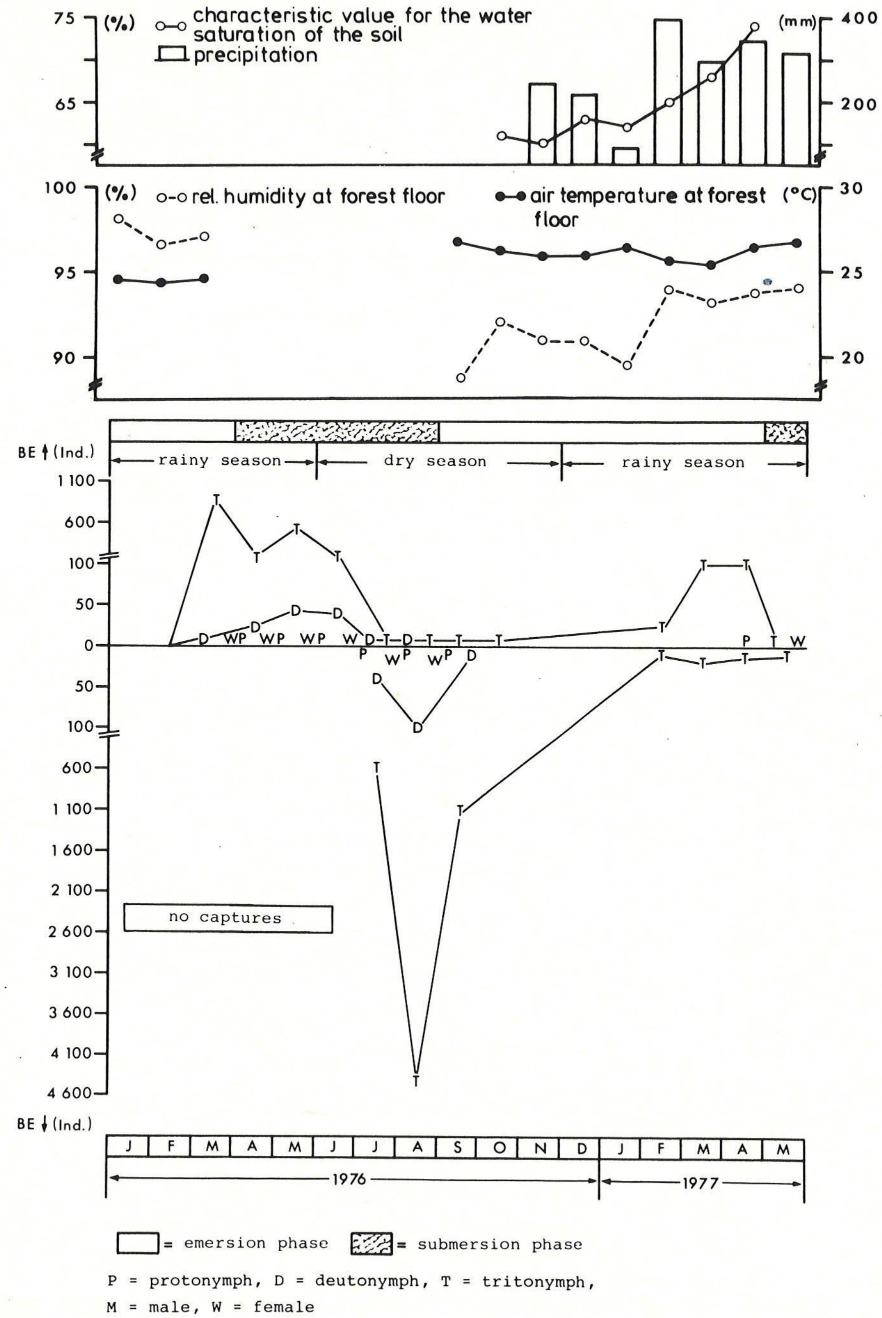

Fig. 15: Trunk migration (upwards/downwards) TM (January 1976 - May 1977; 3 BE each): *Brazilatemnus browni* MUCHMOORE 1975.

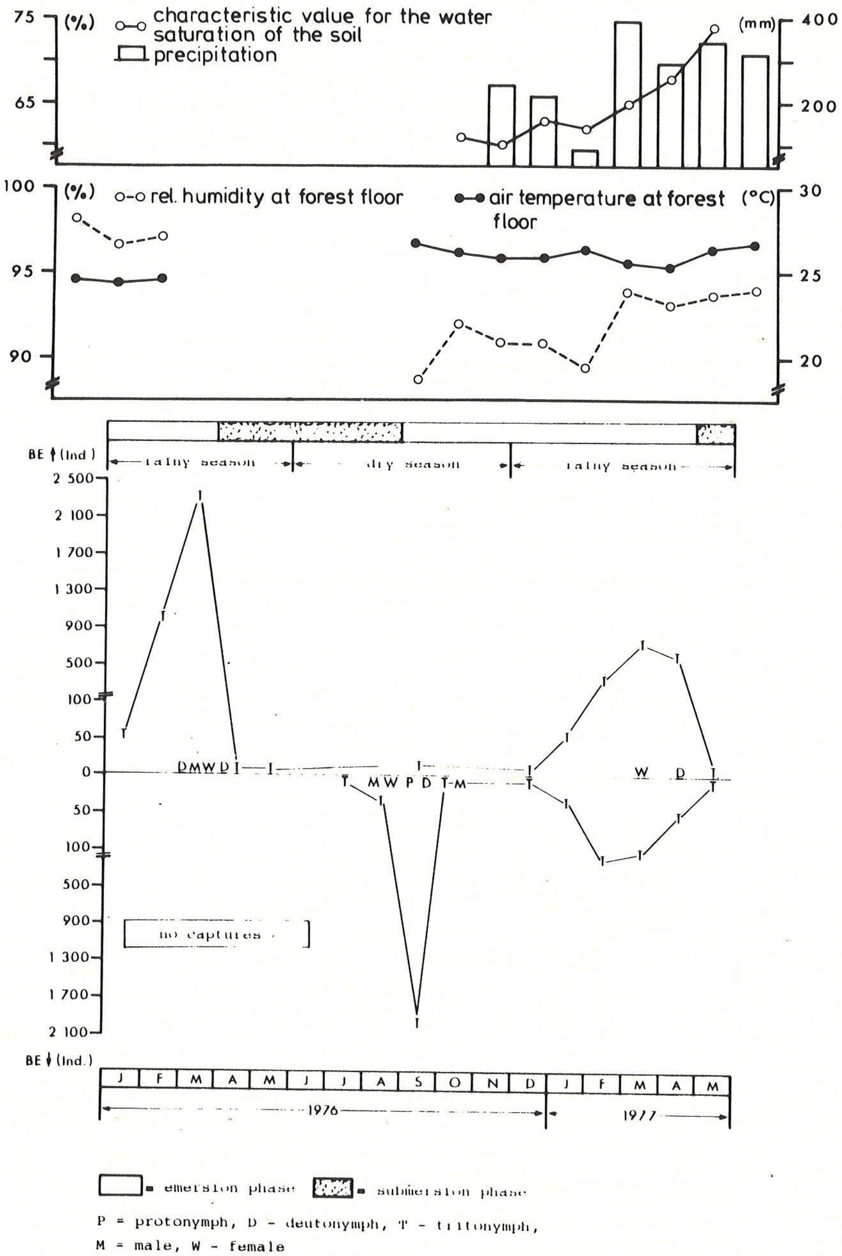

Fig. 16: Trunk migration (upwards/downwards) TM (January 1976 - May 1977; 3 BE each): *Tyrannochthonius amazonicus* MAHNERT 1979 (n. sp.).

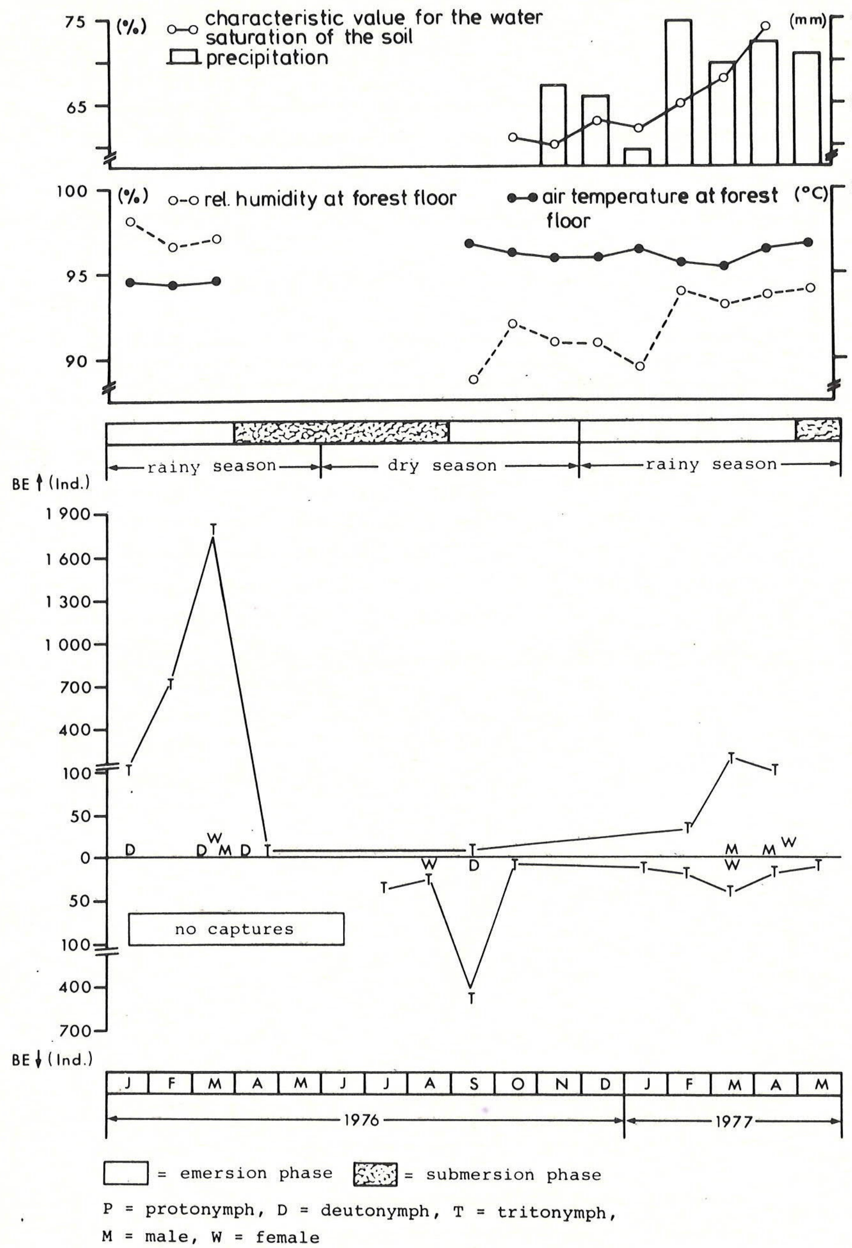

Fig. 17: Trunk migration (upwards/downwards) TM (January 1976 - May 1977; 3 BE each): *Tyrannochthonius migrans* MAHNERT 1979 (n. sp.).

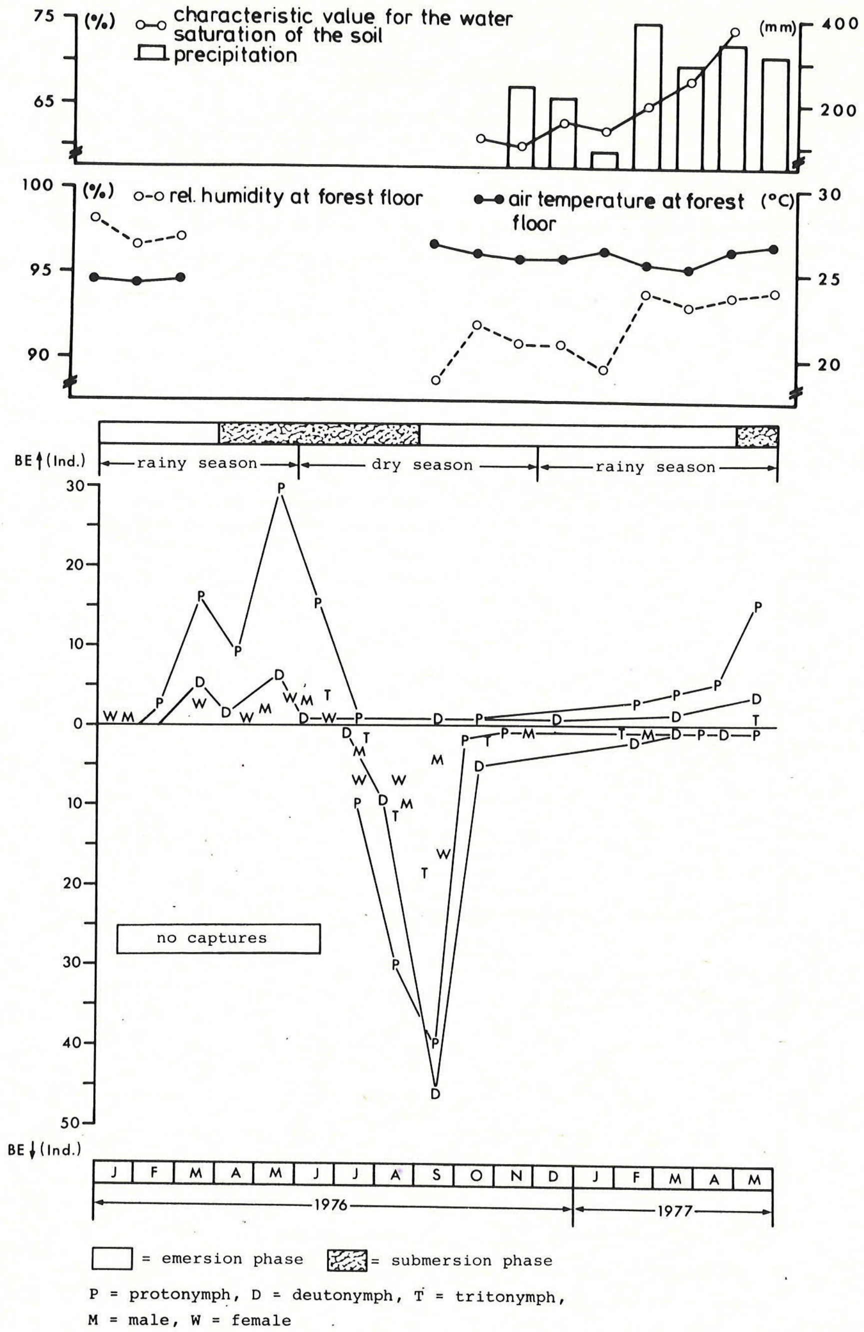

Fig. 18: Trunk migration (upwards/downwards) TM (January 1976 - May 1977; 3 BE each): *Pachyolpium irmgardae* MAHNERT 1979 (n. sp.).

Table 10: **Trunk migration (upwards) TM – Formicoidea**
(Jan. - June 1976; 3 BE).
Dominance of frequent species on the total catch (Σ N ↑ = 5.326)

		N ↑	% Σ N ↑
1	*Wasmannia rochai* Forel	1.082	20,32
2	*Azteca* a	543	10,20
3	*Hypoclinea lutosa* (F. Smith)	523	9,82
4	*Camponotus* (Mbr.) ? *senex* (F. Smith)	392	7,36
5	*Procryptocerus hylaeus* Kempf	340	6,38
6	*Crematogaster brevispinosa* Mayr	309	5,80
7	*Daceton armigerum* (Latr.)	220	4,13
8	*Pseudomyrmex flavidulus* (F. Smith)	202	3,79
9	*Pseudomyrmex* (sp.) a	117	2,20
10	*Pseudomyrmex gracilis* (Fabr.)	111	2,08
11	*Monacis bispinosa* (Olivier)	106	1,99
12	*Azteca* b	104	1,95
13	*Labidus praedator* (F. Smith)	96	1,80
	total:	4.145	77,82

Table 11: **Trunk migration (upwards) TM – Formicoidea**
(Jan. - June 1976; 3 BE)
Dominance of 47 identified species (ranks in %).

	rainy season							
	emersion phase			submersion phase				
	J	F	M	A	M	J	N ↑	%
1 *Wasmannia rochai* Forel	309	361	412	–	–	–	1.082	23,72
2 *Azteca* a	173	174	194	2	–	–	543	11,90
3 *Hypoclinea lutosa* (F. Smith)	225	141	157	–	–	–	523	11,46
4 *Camponotus* (Mbr.) ? *senex* (F. Smith)	152	93	110	13	15	9	392	8,59
5 *Procryptocerus hylaeus* Kempf	85	140	106	7	1	1	340	7,45
6 *Crematogaster brevispinosa* Mayr	98	100	111	–	–	–	309	6,77
7 *Daceton armigerum* (Latr.)	70	54	82	9	4	1	220	4,82
8 *Pseudomyrmex flavidulus* (F. Smith)	88	42	70	2	–	–	202	4,43
9 *Pseudomyrmex gracilis* (Fabr.)	33	23	28	8	15	4	111	2,43
10 *Monacis bispinosa* (Olivier)	29	41	28	5	2	1	106	2,32
11 *Azteca* b	36	34	33	1	–	–	104	2,28
12 *Labidus praedator* (F. Smith)	–	–	96	–	–	–	96	2,10
13 *Pseudomyrmex pr. gracilis* b	19	12	19	–	1	1	52	1,14
14 *Hylomyrma transversa* Kempf	–	–	6	28	1	–	35	0,77
14 *Pseudomyrmex filiformis* (Fabr.)	16	5	13	–	1	–	35	0,77
15 *Camponotus* (Mbr.) *trapezoideus* Mayr	9	14	8	–	1	2	34	0,75
16 *Pseudomyrmex* sp. b	15	5	11	–	–	–	31	0,68
17 *Pseudomyrmex subtilissimus* (Emery)	12	3	15	–	–	–	30	0,66
18 *Cephalotes atratus* (Linné)	6	12	5	–	2	–	25	0,55
18 *Crematogaster limata* F. Smith	11	3	6	5	–	–	25	0,55
18 *Odontomachus haematodus* (Linné)	–	–	3	12	9	1	25	0,55
19 *Hypoclinea diversa* Emery	6	8	8	–	2	–	24	0,53
20 *Brachymyrmex pictus* Mayr	7	4	7	–	–	–	18	0,39
20 *Gnamptogenys striatula* Mayr	–	–	–	17	1	–	18	0,39
20 *Plathyrea sinuata* Roger	5	5	4	1	1	2	18	0,39
21 *Procryptocerus spiniperdus* Forel	5	3	1	4	–	–	13	0,29
22 *Cephalotes serraticeps* (F. Smith)	2	4	4	–	2	–	12	0,26
22 *Pseudomyrmex faber* (F. Smith)	5	4	2	1	–	–	12	0,26
22 *Pseudomyrmex oculatus* (F. Smith)	4	8	–	–	–	–	12	0,26
23 *Pseudomyrmex* ? (sp. a) *ejectus*	–	9	–	2	–	–	11	0,24
23 *Pseudomyrmex* sp. c	8	3	–	–	–	–	11	0,24
24 *Pseudomyrmex unicolor* (F. Smith)	4	1	4	–	1	–	10	0,22
24 *Zacryptocerus minutus* (Fabr.)	5	4	–	–	–	1	10	0,22
25 *Camponotus* (Mthr.) *abdominalis* (F.)	4	–	3	1	1	–	9	0,20
26 *Pheidole* sp. b esp. *comprido*	–	–	–	4	4	–	8	0,18
26 *Pseudomyrmex atripes* (F. Smith)	2	3	3	–	–	–	8	0,18
27 *Pseudomyrmex browni* Kempf	3	4	–	–	–	–	7	0,15
28 *Hypoclinea bidens* L.	4	1	1	–	–	–	6	0,13
28 *Monomorium pharaonis* L.	–	1	2	1	1	1	6	0,13
28 *Pseudomyrmex pictus* (Stitz)	3	3	–	–	–	–	6	0,13
28 *Pseudomyrmex tenuis* (Fabr.)	–	–	3	3	–	–	6	0,13
29 *Camponotus* (Myrm.) *linnaei* Forel	3	1	–	–	–	–	4	0,09
29 *Procryptocerus hirsutus* Emery	3	–	1	–	–	–	4	0,09
30 *Leptothorax* pr. *spininodis*	2	1	–	–	–	–	3	0,07
30 *Zacryptocerus pallens* (Klug)	–	1	2	–	–	–	3	0,07
31 *Gnamptogenys concinna* (F. Smith)	–	2	–	–	–	–	2	0,04
32 *Pheidole* gr. *flavens* sp. c	–	–	–	–	–	1	1	0,02
total:	1.465	1.323	1.558	126	65	25	4.562	100,00 %

b) Formicoidea: Jan.- June 1976 (trunk migration – upwards)

Specimens of the trunk migration (upwards/downwards) from July 1976 - May 1977 have not been studied yet.

Species spectrum and dominance

In total 5.499 Formicoidea (71 species, 30 genera) were caught. 6 species were dominant (> 5 % on the total catch), 7 species subdominant (1 - 5 %) and 58 species uncommon (< 1 %; comp. Table 10). 47 species could be identified (Table 11). An additional 27 species are still being studied. 123 specimens (= 2 %, partially fragments) could not be identified.

The biology of neotropical Formicoidea is poorly known (KEMPF 1961, 1970). Designation of species to a prefered habitat or stratum is difficult (BROWN/KEMPF, pers. commun.). According to recent studies in swamp-forests near Belém (OVERAL, pers. commun.) most probably all species, except the four mentioned below, are arboricoles. Typical tree inhabitants, e. g. *Daceton armigerum* and *Cephalotus atratus* (KEMPF 1961, 1970 and pers. commun.) came on to the forest floor as well during the emersion phase, especially in the dry season. High air temperatures and low rel. humidity apparently stimulated migrations up and down the trunk.

Terricole species, as for example *Labidus praedator* and *Odontomachus haematodus* (KEMPF 1961, 1970) escaped inundation – apparently with increasing humidity of air and soil – by migrating into the trunk and canopy region. Both species have also been frequently caught during downward migrations on trunks at the end of the submersion phase of 1976. In February/March and in November of 1976 they appeared in ground photo-eclectors. *Gnamptogenys striatula* and *Pheidole* sp. b esp. *comprido* presumably are soil inhabitants as well (comp. KEMPF 1970).

c) Meinertellidae (Archeognatha)*: Jan. - March 1976 (trunk migration - upwards)

The specimens caught have not yet been studied totally.

Species spectrum and dominance

During the emersion phase 1975/76, 83 Meinertellidae (♂, ♀) were caught while migrating up the trunk (comp. Table 5). They belonged to two new species of the genus Neomachilellus WYGODZINSKY: *Neomachilellus adisi* and *Neomachilellus scandens* (Meinertellidae, Mycrocoryphia; WYGODZINSKY 1978, Table 12).

Little is known about life cycles, development phases, nutrition and biotope linkage of neotropical Meinertellidae. Until now, species of the genus *Neomachilellus* have only been recorded from the south of Brazil (WYGODZINSKY 1952, 1978). Most probably, *N. adisi* and *N. scandens* live mainly in the trunk (canopy) area. Apparently, this is also true for other *Neomachilellus* species (WYGODZINSKY, unpubl.). Recently, Meinertellidae have been collected in large numbers during canopy fogging of terra firme forests (*Meinertellus* n. sp., *Neomachilellus* n. sp., STURM, MS; MONTGOMERY et al. 1981, ERWIN et al., in prep.). At the beginning of the emersion phase, ♂♂ and ♀♀ of *N. adisi* and *N. scandens* came – at least partially – for reproduction on to the forest floor (comp. Table 5). From September until November, juvenile specimens occurred in ground photo-eclectors. All stages migrated into the trunk/canopy area, especially in October/November (comp. Table 5). Presumably both species are univoltine (WYGODZINSKY, pers. commun.).

*Classification of BRITTON et al. 1973

Table 12: **Trunk migration (upwards) TM – Meinertellidae**
(Jan. - March 1976; 3 BE).
* sex of 1 specimen dubious; new species (n. sp.) described by WYGODZINSKY (1978).

species	captures / month J	F	M	N↑	total ♂	♀
Neomachilellus adisi n. sp.	10	18	6	34	13	21*
Neomachilellus scandens n. sp.	13	11	25	49	24	25*
total:	23	29	31	83	37	46

Table 13: **Trunk migration (upwards) TM – Iguanidae**
(Jan. 1976 - May 1977; 3 BE).

species	capture period (month/year)	number
Anolis ortonii Cope	2/1976	1
	3/1976	1
	7/1976	1
	1/1977	1
Plica umbra Linnaeus	2/1976	1
	8/1976	2
Uranoscodon superciliosum Linnaeus	5/1976	1
	7/1976	1

d) Other animal groups

Arboreal photo-eclectors also caught other animal groups. Sauria have already been totally evaluated.

Sauria: Jan. 1976 - May 1977 (trunk migration – upwards/downwards)

Three lizard species (Iguanidae) were caught migrating up the trunk (Table 13). *Anolis ortonii* and *Plica umbra* occurred during the emersion phase and during high water as well. They are day active tree inhabitants (HOOGMOED 1973; RAND and HUMPHREY 1968). *Urano scodon super ciliosum* lives at the forest edge of neotropical riverbank forests, at shady places on the ground and in the lower trunk area. Only during the submersion phase did this lizard come into the inner forest. All three species mostly feed on arthropods (comp. HOOGMOED 1973).

3.1.2. Curarí Island

3.1.2.1. Group spectrum and dominance*

From January to December 1976, 44.849 arthropods were caught in arboreal photo-eclectors (Table 14), the above-mentioned groups being disregarded (p. 16): 25.806 during upward migrations and trunk approaches, 19.043 during downward migrations and trunk approaches (comp. Fig. 20). The dominant group was Formicoidea, with 69,9 % of the total catch. Then followed Coleoptera adults (16,2 %), Araneae (5,1 %), Coleoptera larvae, Lepidoptera and Saltatoria (1 - 2 % each). Diptera have not been evaluated (comp. ADIS 1977a). "Other" arthropods (comp. Table 14) were Trichoptera (13 imagines), Aphidoidea (7), Symphyla (6), Opiliones (3), Neuroptera (2 larvae), Isopoda, Odonata (Zygoptera) and Zoraptera (1 each). Furthermore, 21 Anura, 6 Sauria, and sporadically Nematoda, Oligochaeta and Gastropods were captured.

3.1.2.2. Trunk migration (upwards/downwards) and trunk approach (= activity density) throughout the year

During the emersion phase, pterygote insects dominated (Table 14). In the **dry season** Coleoptera (larvae and imagines), especially Staphylinidae and Carabidae, were numerous. Bark breeding Platypodidae and Scolytidae attacked trunks. Corticole Pseudoscorpiones, Chilopoda (mostly Scolopendromorpha), Diplopoda (exclusively Polyxenidae) and Psocoptera occurred as well. Numerous Araneae and Formicoidea migrated between canopy and forest floor (Fig. 19).

In the **rainy season**, particularly Saltatoria migrated more frequently upwards on the trunk. Besides juvenile Grylloidea (about 35 % of the total catch), there were mainly Tettigonoidea (about 45 %). Furthermore, nymphs of Cicadina occurred more frequently. Within the Araneae, upward migration on the trunk only increased slightly during the rainy season (comp. Fig. 19, Table 14). Terricole arthropods, which – like in the Igapó – emigrated in high numbers to the trunk/canopy area, did not occur.

* Group spectrum = range of taxa evaluated.

Table 14: **Trunk migration (upwards/downwards) and trunk approach RS (activity density)**[+]
monthly captures ↑ upwards migration (trunk approach): Jan. - Dec. 1976 (3 BE);
↓ downwards migration (trunk approach): July - Dec. 1976 (3 BE);
tendency ↑ : ↓ (↑, ↓ = χ^2 sign. for $p < 0.01$; (↑), (↓) = χ^2 sign. for $p < 0.05$).

		rainy season						dry season									
		emersion phase				submersion phase			emersion phase								
		J	F	M	A	M	J	J	A	S	O	N	D	N↑	N↓	ΣΣ	%ΣΣ
1 Formicoidea	↑	6805	4743	1926	419	175	35	/	217	2506	1336	1408	1216	20786			
	↓							428	1176	6098	1818	514	558		10592	31378	69,96
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↓				
2 Coleoptera	↑	258	227	34	32	104	141	/	18	56	83	81	928	1962			
	↓							650	849	702	1071	1342	713		5327	7289	16,25
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↑				
3 Araneae < 5 mm	↑	154	106	108	48	192	123	/	36	127	95	84	40	1113			
	↓							109	96	171	72	63	38		549	1662	3,71
	Tend.	-	-	-	-	-	-	-	↓	↓	-	-	-				
4 Coleoptera lv	↑	-	-	-	-	-	-	/	-	-	1	-	-	1			
	↓							5	24	240	239	216	88		812	813	1,81
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↓				
5 Araneae > 5 mm	↑	46	45	109	21	18	3	/	9	69	51	44	24	439			
	↓							18	30	51	24	31	28		182	621	1,39
	Tend.	-	-	-	-	-	-	-	↓	-	↑	-	-				
6 Lepidoptera ad	↑	6	1	1	-	24	2	/	28	10	5	3	-	80			
	↓							72	261	59	5	11	11		419	499	1,11
	Tend.	-	-	-	-	-	-	-	↓	↓	-	(↓)	↓				
7 Saltatoria	↑	100	86	136	31	32	2	/	5	20	22	26	13	473			
	↓							2	1	2	1	2	6		14	487	1,09
	Tend.	-	-	-	-	-	-	-	-	↑	↑	↑	-				
8 Isoptera	↑	1	1	-	-	-	-	/	-	1	2	8	-	13			
	↓							218	110	16	12	5	6		367	380	0,85
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	-	(↓)				
9 Psocoptera	↑	4	4	4	4	1	1	/	-	19	9	29	45	120			
	↓							58	112	39	6	5	9		229	349	0,78
	Tend.	-	-	-	-	-	-	-	↓	↓	-	↑	↑				
10 Blattodea lv	↑	96	73	17	9	5	2	/	2	38	25	12	14	293			
	↓							4	3	1	4	5	3		20	313	0,70
	Tend.	-	-	-	-	-	-	-	-	↑	↑	-	↑				
11 Pseudoscorpiones	↑	4	5	2	1	1	-	/	1	23	10	4	4	55			
	↓							5	21	59	37	16	46		184	239	0,53
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↓				
12 Hymenoptera*	↑	35	23	11	-	8	1	/	9	11	5	5	5	113			
	↓							7	11	23	6	4	7		58	171	0,38
	Tend.	-	-	-	-	-	-	-	-	(↓)	-	-	-				
13 Cicadina lv	↑	49	28	4	3	1	-	/	-	8	2	3	-	98			
	↓							2	-	-	-	-	1		3	101	0,23
	Tend.	-	-	-	-	-	-	-	-	↑	-	-	-				
14 Heteroptera lv	↑	23	8	4	-	-	1	/	1	17	1	4	2	61			
	↓							1	-	10	2	3	3		19	80	0,18
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-				
15 Chilopoda	↑	1	-	1	-	1	-	/	-	-	-	1	2	6			
	↓							16	20	3	1	8	17		65	71	0,16
	Tend.	-	-	-	-	-	-	-	↓	-	-	(↓)	↓				
16 Mantodea	↑	41	5	2	-	2	-	/	1	5	6	2	1	65			
	↓							-	-	-	-	-	-		-	65	0,14
	Tend.	-	-	-	-	-	-	-	-	(↑)	(↑)	-	-				
17 Diplopoda (=Polyxenidae)	↑	-	-	-	-	-	-	/	-	1	-	-	-	1			
	↓							5	21	18	4	6	3		57	58	0,13
	Tend.	-	-	-	-	-	-	-	↓	↓	(↓)	(↓)	-				
18 Heteroptera ad	↑	1	1	-	-	1	1	/	2	3	-	2	1	12			
	↓							2	8	18	3	7	5		43	55	0,12
	Tend.	-	-	-	-	-	-	-	-	↓	-	-	-				
19 Lepidoptera lv	↑	4	5	1	1	1	-	/	-	9	1	-	1	23			
	↓							-	-	8	3	4	6		21	44	0,10
	Tend.	-	-	-	-	-	-	-	-	-	-	(↓)	-				
20 Blattodea ad	↑	11	4	1	-	-	-	/	-	6	1	1	1	25			
	↓							3	4	1	2	3	3		16	41	0,09
	Tend.	-	-	-	-	-	-	-	(↓)	-	-	-	-				

		J	F	M	A	M	J	J	A	S	O	N	D	N↑	N↓	ΣΣ	%ΣΣ
21 Dermaptera	↑	-	1	1	-	10	3	/	-	-	-	-	-	15			
	↓							3	6	3	3	4	1		20	35	0,08
	Tend.	-	-	-	-	-	-	-	(↓)	-	-	(↓)	-				
others	↑	-	-	1	1	1	11	/	3	2	-	1	1	21			
	↓							4	6	-	-	-	2		12	32	0,07
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-				
total:		7644	5368	2363	571	580	326	/	333	2939	1660	1719	2303	25806			
								1614	2761	7536	3320	2252	1560		19043	44849	100 %
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↑				

Coleoptera		J	F	M	A	M	J	J	A	S	O	N	D	N'↑	N'↓	Σ	%Σ	%ΣΣ
Platypodidae/	↑	232	195	14	5	-	-	/	-	-	12	43	752	1253				
Scolytidae	↓							68	49	196	505	682	381		1881	3134	43,00	6,99
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↑					
Staphylinidae	↑	3	1	5	7	59	74	/	8	16	30	18	29	250				
	↓							384	131	58	38	37	51		699	949	13,02	2,12
	Tend.	-	-	-	-	-	-	-	↓	↓	-	(↓)	(↓)					
Carabidae	↑	-	2	-	10	19	2	/	1	1	-	1	2	38				
	↓							20	226	94	44	31	68		483	521	7,15	1,16
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↓					
Curulionidae	↑	7	5	2	2	1	16	/	1	11	9	7	44	105				
	↓							11	82	50	25	20	32		220	325	4,46	0,72
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	(↓)	-					
Elateridae	↑	5	-	-	-	-	4	/	-	1	4	2	2	18				
	↓							5	16	40	9	25	18		113	131	1,80	0,29
	Tend.	-	-	-	-	-	-	-	↓	↓	-	↓	↓					
Cerambycidae	↑	4	18	3	4	1	1	/	1	5	9	1	9	56				
	↓							-	1	-	-	-	-		1	57	0,78	0,13
	Tend.	-	-	-	-	-	-	-	-	(↓)	↓	-	↓					
others	↑	7	6	10	4	24	44	-	7	22	19	9	90	242				
	↓							162	344	264	450	547	163		1930	2172	29,80	4,84
	Tend.	-	-	-	-	-	-	-	↓	↓	↓	↓	↓					
Hymenoptera*																		
Apidae	↑	12	-	-	-	1	-	/	1	-	-	-	-	14				
	↓							5	8	12	2	-	1		28	42	24,56	0,09
	Tend.	-	-	-	-	-	-	-	(↓)	↓	-	-	-					
others	↑	23	23	11	-	7	1	/	8	11	5	5	5	99				
	↓							2	3	11	4	4	6		30	75,44	0,29	
	Tend.	-	-	-	-	-	-	-	-	-	-	-	-					

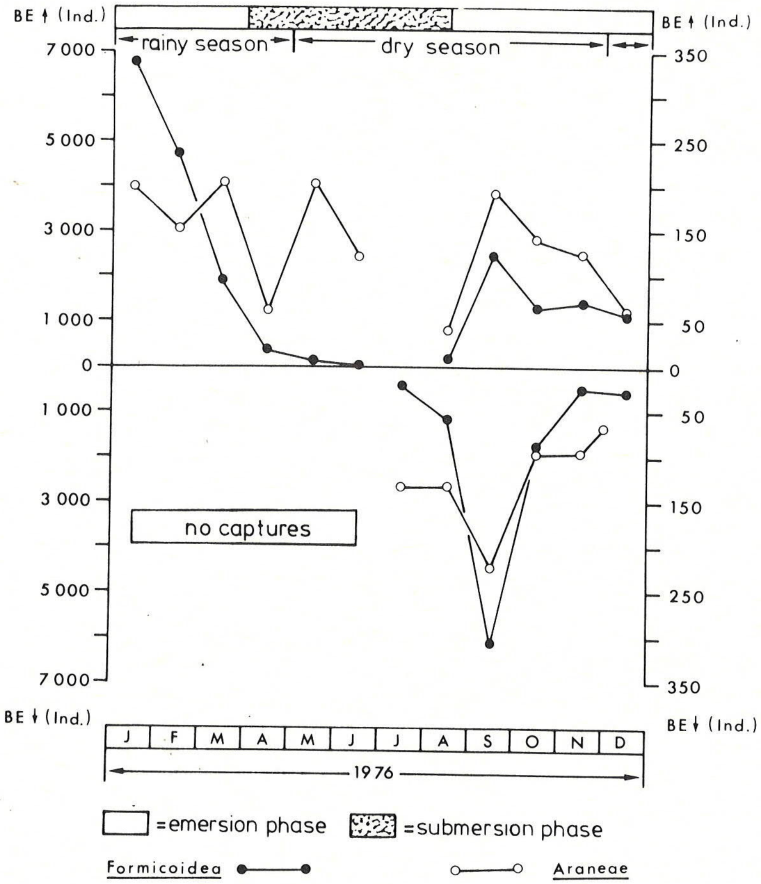

Fig. 19: Trunk migration (upwards/downwards) RS (January - December 1976; 3 BE each): Formicoidea, Araneae

3.1.2.3. Activity of some species on the trunk

a) Pseudoscorpiones: Jan. - Dec. 1976 (trunk migration – upwards/downwards)
Species spectrum and dominance

In arboreal photo-eclectors of the Várzea, Pseudoscorpiones occurred only sporadically (comp. Table 14). They represented mainly corticole species. In total, 239 specimens were caught: 55 during upward migrations and 184 migrating down the trunk (Table 15). Out of 9 species (belonging to 3 families) 6 were new to science (MAHNERT 1979). 5 species occurred in the Várzea, only 4 species in both Várzea and Igapó (Table 15).

Table 15: **Trunk migration (upwards/downwards) RS – Pseudoscorpiones**
monthly captures ↑ upward migration (trunk approach): Jan. - Dec. 1976 (3 BE);
↓ downward migration (trunk approach): July - Dec. 1976 (3 BE);
tendency ↑ : ↓ (↑, ↓ = χ^2 sign. for $p < 0.01$; (↑); (↓) = χ^2 sign. for $p < 0.05$.

Dominance of species on the total catch; habitat association to biology of closely related species (MAHNERT, pers. commun.); * = exclusively occuring at RS; new species (n. sp.) described by MAHNERT (1979).

		rainy season						dry season									
		emersion phase			submersion phase				emersion phase								
Species / family		J	F	M	A	M	J	J	A	S	O	N	D	N↑	N↓	ΣΣ	%ΣΣ
1 Parawithius (Victor-	↑	2	3	2	–	1	–	/	1	4	2	–	–	15			
withius) coniger n. sp.*	↓							2	11	37	13	2	2		67	82	34,31
(Withiidae)	Tend.	–	–	–	–	–	–	–	↓	↓	↓	–	–				
habitat: (bark)																	
2 Dolichowithius	↑	2	2	–	–	–	–	/	–	1	5	2	3	15			
mediofasciatus n. sp.	↓							1	2	2	11	11	39		66	81	33,89
(Withiidae)	Tend.	–	–	–	–	–	–	–	–	–	–	(↓)	↓				
habitat: (bark)																	
3 Pachychernes baileyi	↑	–	–	–	–	–	–	/	–	–	1	–	–	1			
Feio	↓							2	8	20	10	2	4		46	47	19,66
(Chernetidae)	Tend.	–	–	–	–	–	–	–	↓	↓	↓	–	(↑)				
habitat: bark																	
4 Parachernes	↑	–	–	–	1	–	–	/	–	16	1	1	1	20			
ovatus n. sp.*	↓							–	–	–	–	–	–		–	20	8,37
(Chernetidae)	Tend.	–	–	–	–	–	–	–	–	↑	–	–	–				
habitat: (bark)																	
5 Parachernes	↑	–	–	–	–	–	–	/	–	2	–	–	–	2			
adisi n. sp.*	↓							–	–	–	2	–	–		2	4	1,67
(Chernetidae)	Tend.	–	–	–	–	–	–	–	–	–	–	–	–				
habitat: (bark)																	
6 Parachernes plumosus	↑	–	–	–	–	–	–	/	–	–	1	–	–	1			
(With)	↓							–	–	–	1	–	–		1	2	0,84
(Chernetidae)	Tend.	–	–	–	–	–	–	–	–	–	–	–	–				
habitat: (bark)																	
7 Dolichowithius	↑	–	–	–	–	–	–	/	–	–	–	–	–	–			
emigrans (Tullgren)*	↓							–	–	–	–	–	1		1	1	0,42
(Withiidae	Tend.	–	–	–	–	–	–	–	–	–	–	–	–				
habitat: (bark)																	
7 Tyrannochthonius	↑	–	–	–	–	–	–	/	–	–	–	1	–	1			
migrans n. sp.	↓							–	–	–	–	–	–		–	1	0,42
(Chtoniidae)	Tend.	–	–	–	–	–	–	–	–	–	–	–	–				
habitat: litter																	
7 Parachernes	↑	–	–	–	–	–	–	/	–	–	–	–	–	–			
inpai n. sp.*	↓							–	–	–	–	1	–		1	1	0,42
(Chernetidae)	Tend.	–	–	–	–	–	–	–	–	–	–	–	–				
habitat: (bark)													total:	55	184	239	100 %

Activity density and trunk migration (upwards/downwards) throughout the year

Corticole Pseudoscorpiones were mostly caught in the emersion phase, on both tree species. They occurred – like in the Igapó – particularly during the dry season in the lower trunk region (Table 15). Within dominant species, all instars could be found (Table 16). *Parachenes ovatus* was captured on the forest floor as well. Here, in addition, *Americhernes bethaniae* and *Paratemnus minor* occurred (comp. Table 7).

b) Other animal groups

Besides arthropods, other animal groups also occurred in arboreal photo-eclectors. Some of these already have been taxonomically evaluated.

Anura: Jan. - Dec. 1976 (trunk migration – upwards/downwards)

7 species were caught in arboreal photo-eclectors of the Várzea (Table 17). They represent mainly night active inhabitants of open areas (e.g. river shore, river bank, partly near forests; comp. HEYER 1976), which only occurred in the forest during the submersion phase. *Hyla raniceps* lives in floating meadows (HÖDL 1977). These are drifting into the forest during high water. *Hyla rubra* also occurred during the emersion phase in the forest (comp. HEYER 1976).

Sauria: Jan. - Dec. 1976 (trunk migration – upwards/downwards)

During the submersion phase, 3 species were caught migrating up the trunk (Table 8). *M. mabouya* (Scincidae) and *K. calcarata* (Teiidae) live in sunny places on the ground and in the lower trunk region (up to 2 m height; HOOGMOED 1973) in neotropical forests. They mainly feed on arthropods (BEEBE 1925, 1945).

Oligochaeta: Jan. - Dec. 1976 (trunk migration – upwards/downwards)

The specimens caught belonged mainly to one "earthworm" species: *Dichogaster andina evae.*

3.2. Activity density on the ground, emergence abundance, phenology

Ground photo-eclectors and pitfall traps detect animals particularly on the ground surface and soil, but also detect inhabitants of other habitats, for example, of trunk and canopy regions. Their catches enable statements on species inventory, dominance structure, activity density and phenology of arthropods (ADIS 1979; FUNKE 1971, 1976; THIEDE 1977). For insects which are epigeous as imagines or which have soil living development stages, ground photo-eclectors provide data for the calculation of emergence abundance, a basic value for estimation of the production of imagines/m^2 (ha) x year (FUNKE 1972). In neotropical inundation-forests, ground photo-eclectors provide information on activity periods, migrations and life cycles during the emersion phase, but only exceptionally give some indications on the emergence abundance of insect imagines.

The captures from pitfall traps and ground photo-eclectors have only been partially studied. Acari, Collembola and Thysanoptera have not been evaluated.

Table 16: **Trunk migration (upwards/downwards) RS – Pseudoscorpiones**
(Jan. - Dec. 1976; 3 BE each).
Dominance of all instars and sexes (for frequent species in %; all instars were not found for all species). New species (n. sp. described by MAHNERT (1979); * +1 nymph, stage indeterminable, P = protonymph, D = deutonymph, T = tritonymph, ♂ ♀.

species / (family)		N↑	N↓	% ↑	% ↓
1 Parawithius (Victorwithius)	P	8	13	53,3	19,4
coniger n. sp.	D	-	7	-	10,4
(Withiidae)	T	-	5	-	7,5
	♂	4	16	26,7	23,9
	♀	3	26	20.0	38,8
2 Dolichowithius	P	8	15	53,3	22,7
mediofasciatus n. sp.	D	3	8	20,0	12,1
(Withiidae)	T	1	5	6,7	7,6
	♂	-	11	-	16,7
	♀	3	27	20,0	40,9
3 Pachychernes baileyi Feio	P	1	16	100,0	34,8
(Chernetidae)	D	-	4	-	8,6
	T	-	5	-	10,9
	♂	-	16	-	34,8
	♀	-	5	-	10,9
4 Parachernes ovatus n. sp.	D	2	-		
(Chernetidae)	T	2	-		
	♂	4	-		
	♀	12	-		
5 Parachernes adisi n. sp.*	♂	1	-		
(Chernetidae)	♀	1	1		
6 Parachernes plumosus (With)	D	1	-		
(Chernetidae)	♂	-	1		
7 Dolichowithius emigrans	♀	-	1		
(Tullgren) / (Withiidae)					
7 Parachernes inpai n. sp.	P	-	1		
(Chernetidae)					
7 Tyrannochthonius migrans n. sp.	T	1	-		
(Chtoniidae)					

Table 17: **Trunk migration (upwards/downwards) RS – Anura**
(Jan. - Dec. 1976; 3 BE each).

species	capture period (month/year)	number	↑/↓
Hyla goinorum	3/1976	3	↑
	4/1976	1	↑
Hyla minima	5/1976	1	↑
Hyla raniceps	5/1976	2	↑
Hyla rubra	1/1976	3	↑
	4/1976	1	↑
	5/1976	1	↑
	7/1976	3	↓
	10/1976	1	↑
	11/1976	1	↑
Hyla sp. A	8/1976	2	↑
Hyla geographica - group	4/1976	1	↑
Phrynohyas venulosa	5/1976	1	↑

Table 18: **Trunk migration (upwards) RS – Sauria**
(Jan. - Dec. 1976; 3 BE each).

species (family)	capture period (month/year)	number
Anolis ortonii?	3/1976	1
Anolis ortonii Cope (Iguanidae)	5/1976	1
Mabuya m. mabouya Spix (Scincidae)	5/1976	1
Kentropyx calcarata Lacépède (Teiidae)	5/1976	3

3.2.1. Tarumã Mirím River

3.2.1.1. Group spectrum and dominance

During the emersion phase of 1975/76 about 200 arthropods were caught per pitfall trap within 3 months; in 1976/77 there were captured about 950 arthropods within 7 months (Table 19, 20). The highest dominance of the total catch was recorded for Formicoidea (35,6 and 50,1 %), Coleoptera adults (29,2 and 19,2 %) and larvae of Saltatoria (10,1 and 5,7 %). Other arthropods were less dominant (< 5 %); Nematoda, Oligochaeta and Anura appeared sporadically.

With ground photo-eclectors about 7.800 arthropods/m^2 were caught within three months in 1975/76; in 1976/77 there were captured about 14.000 arthropods/m^2 within 7 months (Table 21, 22). The highest dominance of the total catch, the above mentioned groups excluded, was recorded for Diptera (35,6 and 54,8 %) and Coleoptera (38,2 and 26,0 %). Then followed Araneae (6,4 and 3,1 %) and Pseudoscorpiones (5,2 and 5,8 %). Other arthropods were less dominant (< 5 %), and Nematoda and Oligochaeta rare.

3.2.1.2. Activity density and emergence abundance throughout the year

At the beginning of the emersion phase, particularly Coleoptera, Formicoidea and Diptera were caught on the forest floor (Table 20, 22). Within the Coleoptera, especially Pselaphidae, Ptiliidae, as well as Carabidae, Curculionidae and Elateroidea occurred. Within the Diptera, there were mainly Cecidomyiidae; within the Formicoidea mostly ground-living species. During the first 14 days (Sept. 76), ground photo-eclectors caught more animals than throughout the following 4 weeks (Oct. 76; comp. Table 26). Many soil inhabitants (Arachnida, Myriapoda, Isopoda) returned – presumably in high numbers – to the forest floor. However, they were only caught sporadically (Table 20, 22). Within the Chilopoda (mostly Geophilomorpha and some Lithobiomorpha) and Opiliones there occurred – like the Meinertellidae – mainly juvenile individuals until the end of October. They obviously hatched on the forest floor. Only from November onwards adult specimens appeared more frequently.

Activity density and emergence abundance (Ind./m^2/month) of holometabolan insects increased until the end of the **dry season** (Table 20, 22). In ground photo-eclectors Diptera dominated. Besides Cecidomyiidae, there were mainly Phoridae. In pitfall traps occurred, besides some few Sciaridae, exclusively wingless females of Phoridae. Moreover, Coleoptera were caught in large numbers. Pitfall traps contained particularly Staphylinidae, Ptiliidae and Pselaphidae, Carabidae, Curculionidae and Elateroidea. Less frequently Scaphidiidae and Nitidulidae were captured. However, they were caught in pitfall traps as numerous as Staphylinidae and Curculionidae (Table 20: others). Platypodidae/Scolytidae, Scarabeidae, Scydmaenidae, Histeridae and Helodidae only occurred sporadically. Other families were rare (e. g. Chrysomelidae, Cucujidae, Dermestidae, Elmidae, Hydrophilidae).

Most of the Coleoptera larvae (about 50 %) belonged to the Clytrinae (Chrysomelidae). Presumably, the Staphylinidae, Curculionidae and Elateroidea represented – at least partly – trunk and canopy inhabitants. Most probably, Formicoidea and Meinertellidae lived mainly in the canopy/trunk region; only during the dry season did they come more or less regularly to the forest floor.

With the beginning of the **rainy season**, activity density and emergence abundance of holometabolan insects increased. This was observed for Coleoptera and Hymenoptera, but was especially true for Diptera (Table 20, 22). Besides Sciaridae, Cecidomyiidae and Phoridae, there now occurred Culicidae and Chironomidae in ground photo-eclectors as well (comp. Table 22).

The highest emergence abundance for Sciaridae observed, was in February 1976 (2. - 9.2.) and in March 1977 (10. - 24.3.). Cecidomyiidae emerged in 1976 more frequently in December (1. - 8.12.). Within the Coleoptera – besides Staphylinidae – the Carabidae, Pselaphidae and Scydmaenidae dominated. Moreover, Platypodidae/Scolytidae, Scaphidiidae and Nitidulidae were still frequent in pitfall traps. Scaphidiidae have been caught mainly in May (1977; comp. Table 20: others). Curculionidae, Elateroidea and Ptiliidae have now been – like on the trunk – less frequent (Table 19 - 22; comp. Table 5). Within the Hymenoptera (without Formicoidea about 96 - 98 %; comp. Table 22) dominated mainly Terebrantes*, particularly Ichneumonoidea* and Cynipoidea* on the forest floor. Aculeata*, e. g. Apidae, were rare (comp. Table 5). Furthermore groups such as Blattodea (imagines and larvae), Cicadina (imagines), Lepidoptera (exclusively "microlepidoptera" imagines) and Heteroptera (mostly imagines of Dipsocoroidea (about 60 %) and Cydnidae (about 20 %)) have been more frequent during the rainy season.

This was also observed for Saltatoria (imagines and larvae). In pitfall traps Grylloidea were at this time caught almost exclusively (about 98 %); in ground photo-eclectors Tettigonoidea (about 4 %) and Caelifera (about 15 %) were taken additionally. The activity density of Pseudoscorpiones, Araneae and Symphyla (Table 21, 22) increased steadily from December - March (1975/76) as well as from December - April (1976/77). The dominance of Symphyla was higher in 1975/76, the number of Pseudoscorpiones lower, compared to 1977. Within the Diplopoda, the Polyxenidae dominated 1975/76 in pitfall traps and ground photo-eclectors. In 1976/77 millipedes included almost exclusively Pygrogdesmidae. Juliformia, as well as Chilopoda and Isopoda were extremely rare. Colobognatha, Uropygi and Dermaptera were absent.

Six to eight weeks before the beginning of the submersion phase (1976 and 1977), activity density of arthropodes was 2 - 4 times higher than at the beginning of the rainy season (Table 19 - 22). Diptera, Coleoptera, Formicoidea, Pseudoscorpiones, Araneae and Symphyla have been particularly frequent. The Formicoidea were mainly represented by soil inhabitants. Just before inundation of the experimental area (1976 and 1977) numerous juvenile Araneae emerged, which migrated into the trunk region.

Clear correlation between the activity density or emergence phenology of individual groups and the weather conditions in the study area are not evident. Only Symphyla occurred more frequently in ground photo-eclectors after heavy rainfalls (1976/77) as compared to dry periods ($p < 0{,}05$).

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* Classification of KAESTNER 1973.

Table 19: **Activity density on the forest floor – TM**
Dec. 5, 1975 - March 15, 1976: 2 BoF.
Dominance of groups on the total catch/month.
*without Formicoidea; + capture period 3 and 2 weeks respectively.

	rainy season D+	J	F	M+	N	%
1 Formicoidea	33	8	16	88	145	35,63
2 Coleoptera ad	41	60	15	3	119	29,24
3 Saltatoria lv	7	5	15	4	41	10,07
4 Araneae > 5 mm	8	7	3	1	19	4,67
5 Blattodea Lv	6	1	1	3	11	2,70
6 Araneae < 5 mm	5	1	4	–	10	2,46
6 Diptera	10	–	–	–	10	2,46
7 Lepidoptera lv	9	–	–	–	9	2,21
8 Coleoptera lv	6	–	2	–	8	1,96
8 Saltatoria ad	1	2	4	1	8	1,96
9 Diplopoda	2	–	3	2	7	1,72
10 Hymenoptera *	2	2	–	1	5	1,23
others	3	3	5	4	15	3,69
total:	133	89	68	117	405	100 %
Coleoptera	D+	J	F	M+	N'	% N'
Platypodidae/Scolytidae	8	33	1	2	44	36,98
Staphylinidae	18	7	5	–	30	25,21
Carabidae	4	–	3	1	8	6,72
Curculionidae	1	1	–	–	2	1,68
Scarabeidae	–	1	–	–	1	0,84
others	10	18	6	–	34	28,57

Table 20: **Activity density on the forest floor – TM**
Sept. 17, 1976 - April 13, 1977; 2 BoF.
Dominance of groups on the total catch/month.
*without Formicoidea; +capture period 2 weeks.

	1976				1977					
	dry season				rainy season					
	S+	O	N	D	J	F	M	A+	N	%
1 Formicoidea	15	76	144	49	45	341	168	108	946	50,05
2 Coleoptera ad	22	20	29	44	34	27	167	20	363	19,21
3 Saltatoria lv	4	4	5	5	10	34	26	20	108	5,71
4 Diptera	3	-	9	3	1	5	58	-	79	4,18
5 Coleoptera lv	12	9	14	14	11	6	5	1	72	3,81
6 Aransae > 5 mm	6	4	10	2	3	7	5	-	37	1,96
7 Araneae < 5 mm	3	5	2	7	4	9	5	1	36	1,90
8 Hymenoptera*	2	2	12	4	-	8	4	1	33	1,75
9 Meinertellidae	1	4	17	3	1	3	-	-	29	1,53
10 Symphyla	-	-	1	1	1	-	13	11	27	1,43
11 Chilopoda	7	16	3	-	-	-	-	-	26	1,38
12 Blattodea lv	-	-	9	7	-	3	1	5	25	1,32
13 Saltatoria ad	-	-	1	-	3	10	8	-	22	1,16
14 Opiliones	1	7	4	1	1	3	-	1	18	0,95
15 Lepidoptera lv	2	6	1	2	-	-	2	-	13	0.69
16 Cicadina lv	1	3	1	1	6	-	-	-	12	0,64
17 Pseudoscorpiones	1	1	5	1	1	-	-	1	10	0,53
18 Heteroptera lv	-	7	-	1	-	1	-	-	9	0,48
19 Heteroptera ad	-	1	-	1	2	3	-	-	7	0,37
20 Diplopoda	-	-	-	-	1	-	3	2	6	0,32
21 Blattodea ad	1	-	-	1	-	-	-	3	5	0,26
others	-	-	2	-	-	3	2	-	7	0,37
total:	81	165	269	147	124	463	467	174	1890	100 %
Coleoptera	S+	O	N	D	J	F	M	A+	N'	% N'
Staphylinidae	2	9	5	9	16	13	13	1	68	18,73
Curculionidae	9	3	6	6	3	-	-	-	27	7,44
Scarabeidae	-	1	2	1	-	-	15	-	19	5,23
Carabidae	-	-	4	4	4	-	-	1	13	3,58
Platypodidae/Scolytidae	-	-	-	1	3	2	5	1	12	3,31
Elateroidea	-	-	1	-	-	-	-	-	1	0,28
others	11	7	11	23	8	12	134	17	223	61,43

Table 21: **Activity density or emergence phenology in the ground photo-eclector – TM**
Dec. 5, 1975 - March 22, 1976: 1 E (Ind./lm^2; collecting box + pitfall trap).
Dominance of groups on the total catch/month.
*without Formicoidea; **mostly Polyxenidae; +capture period 3 weeks.

	rainy season					
	D+	J	F	M+	N	%
1 Coleoptera ad	213	762	539	1466	2980	38,21
2 Diptera	350	780	1340	303	2773	35,55
3 Araneae < 5 mm	5	21	34	433	493	6,32
4 Pseudoscorpiones	2	43	161	200	406	5,20
5 Hymenoptera*	20	80	110	86	296	3,79
6 Heteroptera ad	11	56	116	92	275	3,52
7 Symphyla	-	2	29	88	119	1,52
8 Lepidoptera ad	39	29	16	1	85	1,09
9 Formicoidea	5	5	34	34	78	1,00
10 Blattodea lv	7	4	-	62	73	0,94
11 Diplopoda **	-	-	-	60	60	0,77
12 Cicadina ad	3	10	10	20	43	0,55
13 Saltatoria lv	5	18	5	-	28	0,36
14 Opiliones	-	1	1	19	21	0,27
15 Blattodea ad	-	3	-	16	19	0,24
16 Cicadina lv	2	6	2	8	18	0,23
17 Araneae > 5mm	5	-	-	4	9	0,12
18 Coleoptera lv	1	1	1	3	6	0,08
18 Meinertellidae	6	-	-	-	6	0,08
18 Psocoptera	1	5	-	-	6	0,08
others	1	-	1	4	6	0,08
total:	676	1826	2399	2899	7800	100 %
Coleoptera	D+	J	F	M+	N'	% N'
Staphylinidae	38	291	213	894	1436	48,19
Carabidae	13	31	24	116	184	6,18
Scarabeidae	-	1	-	33	34	1,14
Curculionidae	1	5	5	1	12	0,40
Platypodidae	1	1	-	-	2	0,07
Elateridae	-	-	1	-	1	0,03
others	160	433	296	422	1311	43,99

Table 22: **Activity density or emergence phenology and emergence abundance in the ground photo-eclector – TM**

Sept. 17, 1976 - April 13, 1977; 5 E (Ind./ 5 m^2; collecting box + pitfall trap). Monthly captures, total captures (N), densities (Ind./ m^2) of groups; standard deviation (s in %); * without Formicoidea; $^+$capture period 2 weeks.

	1976 dry season				1977 rainy season							
	S$^+$	O	N	D	J	F	M	A$^+$	N	%	Ind./m^2	%s
1 Diptera	1207	1035	2394	3346	2692	3616	22078	1936	38304	54,79	7660,8	20,2
2 Coleoptera ad	954	804	1151	823	1770	1961	5770	4929	18162	25,98	3632,4	9,8
3 Pseudoscorpiones	1	1	2	84	471	1686	1578	249	4072	5,82	814,4	20,7
4 Araneae < 5mm	31	88	46	127	149	201	470	974	2086	2,98	417,2	87,2
5 Hymenoptera *	32	73	223	298	306	448	323	111	1814	2,60	362,8	16,7
6 Formicoidea	547	36	211	61	105	262	392	155	1769	2,53	353,8	50,0
7 Heteroptera ad	33	25	41	67	161	172	366	120	985	1,41	197,0	15,1
8 Lepidoptera ad	12	6	29	37	70	100	229	108	591	0,85	118,2	28,5
9 Cicadina ad	-	20	42	73	54	40	121	44	394	0,56	78,8	22,7
10 Blattodea ad	10	1	1	6	12	28	133	113	304	0,43	60,8	26,0
11 Symphyla	-	-	-	4	6	51	170	29	260	0,37	52,0	39,0
12 Blattodea lv	-	45	17	10	38	62	57	27	256	0,37	51,2	38,1
13 Psocoptera	13	10	15	13	23	41	59	22	196	0,28	39,2	40,1
14 Saltatoria lv	17	9	8	27	10	22	52	14	159	0,23	31,8	25,2
15 Cicadina lv	12	14	26	18	9	3	29	11	122	0,17	24,4	13,9
16 Meinertellidae	3	33	24	22	5	4	1	-	92	0,13	18,4	57,6
17 Coleoptera lv	31	12	8	29	4	3	4	-	91	0,13	18,2	40,1
18 Araneae ≥ 5mm	3	6	5	7	12	20	12	12	77	0,11	15,4	24,7
19 Chilopoda	24	9	-	4	-	-	3	1	41	0,06	8,2	53,7
20 Diplopoda	-	-	-	-	3	8	10	15	36	0,05	7,2	55,6
21 Saltatoria ad	1	-	7	13	1	4	5	2	33	0,05	6,6	62,1
22 Opiliones	2	4	5	1	4	2	6	1	25	0,04	5,0	26,0
23 Heteroptera lv	-	3	1	3	3	2	1	-	13	0,02	2,6	34,6
others	3	5	4	1	6	3	7	2	31	0,04	6,2	62,9
total:	2936	2239	4260	5074	5914	8739	31876	8875	69913	100 %	13982,6	7,8
Coleoptera	S$^+$	O	N	D	J	F	M	A$^+$	N'	%N'	Ind./m^2	%s
Staphylinidae	160	326	145	143	415	547	2228	2705	6669	36,72	1333,8	16,8
Carabidae	66	68	31	66	209	324	613	367	1744	9,60	348,8	10,3
Elateroidea	73	41	98	59	3	3	6	2	285	1,57	57,0	31,2
Curculionidae	72	51	28	15	8	6	-	1	181	1,00	36,2	37,6
Platypodidae/Scolytidae	6	22	14	14	23	9	49	29	166	0,91	33,2	82,5
Scarabeidae	-	-	2	3	7	3	8	3	26	0,14	5,2	15,4
others	577	296	833	523	1105	1069	2866	1822	9091	50,06	1818,2	9,2
Hymenoptera												
Apocrita	26	68	217	293	302	446	306	92	1750	96,47	350,0	16,3
Symphyta	6	5	6	5	4	2	17	19	64	3,53	12,8	35,9
Diptera												
Nematocera	1202	1030	2393	3333	2666	3585	21944	1830	37983	99,16	7596,6	20,3
Cecidomyiidae	1090	732	1623	1865	1525	1085	1265	370	9555	24,94	1911,0	17,4
Sciaridae	6	69	69	340	378	1961	19327	610	22760	59,42	4522,0	24,0
others	106	229	701	1128	763	539	1352	850	5668	14,80	1133,6	23,8
Brachycera	5	5	1	13	26	31	134	106	321	0,84	64,2	26,3

3.2.1.3. Activity of some species on the ground

Pseudoscorpiones

In pitfall traps (Table 23) some few adults and tritonymphs of *T. amazonicus* were caught in 1976/77.

In ground photo-eclectors 6 species were captured (Table 24). The highest dominance of the total catch was recorded for litter inhabitants, particularly tritonymphs of *Tyrannochthonius amazonicus.* These were more frequent in 1976/77 than in 1975/76. Corticole species (*Americhernes incertus, Paratemnos minor*) occurred more or less accidentally. There was no correlation between the weekly number of individual species caught and the weather conditions in the study area.

3.2.2. Curarí Island

First results are available from pitfall traps and ground photo-eclectors for the rainy season of 1975/76. Acari, Collembola and Thysanoptera remain unworked.

3.2.2.1. Group spectrum and dominance

Within 3 months only about 55 arthropods were caught per pitfall trap (Table 25). Most dominant were Formicoidea (37,2 % of the total catch), Coleoptera (26,5 %) and Araneae (23,2 %). Other arthropods were less frequent. Oligochaeta, Gastropoda and Anura only occurred sporadically.

Within the same period about 1.400 arthropods/m^2 were caught in ground photo-eclectors (Table 26). The highest dominance of the total catch was recorded for Diptera with 67,9 %, the above-mentioned groups excluded. About 75 % were Sciaridae.

Within the Coleoptera (19,5 %), Staphylinidae and Carabidae dominated. Araneae, Formicoidea as well as other arthropods occurred less frequently (< 5 %); Oligochaeta and Gastropoda were rare.

3.2.2.2. Activity density and emergence abundance throughout the year

During the rainy season (1975/76) activity density of most arthropods on the forest floor decreased steadily (Table 25, 26). Only the Formicoidea appeared more frequently at the end of the emersion phase, in March. Diptera emerged in December (20. - 26.12.), and numbers increased in January (3. - 9.1.; Table 26). Many arthropods which were frequent in the Igapó, e.g. Myriapoda, Pseudoscorpiones, and Coleoptera (esp. Pselaphidae, Ptiliidae, Scydmaenidae, Scaphidiidae), were almost absent in the Várzea (comp. Table 19 - 22).

3.2.2.3. Activity of some species on the ground

a) Pseudoscorpiones

3 corticole species occurred on the ground. In pitfall traps *Parachernes ovatus* was caught, one proto- and deutonymph each in January, one tritonymph and one ♀ in February (1976). Two duetonymphs of *Americhernes bethaniae* occurred in December (1975). In ground photo-eclectors *Paratemnus minor* was recorded: two ♀♀ in December (1975) and one ♀ in January 1976.

Table 23: **Activity density on the forest floor – TM: Pseudoscorpiones**
Sept. 17, 1976 - April 13, 1977: 2 BoF.
Dominance of instars and sexes.
T = tritonymph, ♂, ♀; new species described by MAHNERT (1979);
+ capture period 2 weeks.

species/family		1976 dry season S+	O	N	D	1977 rainy season J	F	M	A+	N
Tyrannochthonius	T	-	-	2	-	-	-	-	1	3
amazonicus n. sp.	♂	1	1	1	-	1	-	-	-	4
(Chtoniidae)	♀	-	-	3	-	-	-	-	-	3
	Σ	1	1	6	-	1	-	-	1	10

Table 24: **Activity density in the ground photo-eclector – TM: Pseudoscorpiones**
Dec. 5, 1975 - March 22, 1976: 1 E (Ind./1 m^2; collecting box + pitfall trap).
Sept. 17, 1976 - April 13, 1977: 5 E (Ind./5 m^2; collecting box + pitfall trap).
Monthly captures, total captures (N), densities (Ind./ m^2) with standard deviations (s in %) of all instars and sexes (all instars were not found for all species). P= protonymph, D = deutonymph, T = tritonymph, ♂, ♀. * capture period 2 weeks; + capture period 3 weeks; ★ new species (n.sp.) described by MAHNERT (1979).

species ★/ (family)		emersion phase 1975/76 rainy season D+	J	F	M+	N_{1m^2}	%	emersion phase 1976/77 rainy season S*	O	N	D	J	F	M	A*	N_{5m^2}	%	Ind./m^2	%s
Tyrannochthonius	D	-	-	-	-	-		-	-	-	1	1	-	2	-	4	0,1	0,8	
amazonicus n.sp.	T	-	42	206	130	378	82,6	-	-	1	61	459	1681	1505	235	3942	96,8	788,4	
(Chtoniidae)	♂	-	-	-	-	-	-	-	1	1	12	1	-	4	-	19	0,5	3,8	
	♀	-	1	-	-	1	0,2	-	-	-	3	1	2	3	-	9	0,2	1,8	
	Σ	-	43	206	130	379	82,8	-	1	2	77	462	1683	1514	235	3974	97,6	794,8	19,0
Tyrannochthonius	D	-	-	-	4	4	0,9	-	-	-	-	-	-	-	-	-	-	-	
migrans n.sp.	T	-	-	11	27	38	8,3	-	-	-	-	3	3	52	4	62	1,5	12,4	
(Chtoniidae)	♀	-	-	-	3	3	0,6	-	-	-	-	-	-	-	-	-	-	-	
	Σ	-	-	11	34	45	9,8	-	-	-	-	3	3	52	4	62	1,5	12,4	>150,0
Brazilatemnus	D	-	-	-	4	4	0,9	-	-	-	-	-	-	-	-	-	-	-	
browni Muchmore	T	-	-	-	28	28	6,1	-	-	-	-	-	-	2	7	9	0,2	1,8	
(Miratemnidae)	♀	-	-	-	1	1	0,2	-	-	-	-	-	-	-	-	-	-	-	
	Σ	-	-	-	33	33	7,2	-	-	-	-	-	-	2	7	9	0,2	1,8	106,9
Pachyolpium	P	-	-	-	1	1	0,2	-	-	-	3	4	-	3	-	10	0,2	2,0	
irmgardae n.sp.	D	-	-	-	-	-	-	-	-	-	1	2	-	1	-	4	0,1	0,8	
(Olpiidae)	T	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3	0,1	0,6	
	♂	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	< 0,1	0,4	
	♀	-	-	-	-	-	-	-	-	-	2	-	-	3	1	6	0,2	1,2	
	Σ	-	-	-	1	1	0,2	-	-	-	6	6	-	10	3	25	0,6	5,0	**42,4**
Americhernes	♂	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	< 0,1	0,2	
incertus n.sp.																			
(Chernetidae)	Σ	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	< 0,1	0,2	> 150,0
Paratemnus	♀	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	< 0,1	0,2	
minor (Balzan)	Σ	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	<0,1	0,2	≥ 150,0
(Atemnidae)	ΣΣ	-	43	217	198	458	100 %	1	1	2	84	471	1686	1578	249	4072	100 %	814,4	20,7

Table 25: **Activity density on the forest floor – RS**
Dec. 9, 1975 - March 18, 1976: 7 BoF.
Dominance of groups on the total catch/month.
* without Formicoidea; + capture period 3 and 2 weeks respectively.

	rainy season					
	D+	J	F	M+	N	%
1 Formicoidea	24	35	29	55	143	37,24
2 Coleoptera	38	33	20	11	102	26,56
3 Araneae < 5 mm	24	26	3	-	53	13,80
4 Araneae > 5 mm	12	14	5	5	36	9,38
5 Diptera	5	2	5	3	15	3,91
6 Saltatoria lv	-	2	7	3	12	3,13
7 Pseudoscorpiones	2	2	2	-	6	1,56
7 Hymenoptera *	3	-	3	-	6	1,56
8 Blattodea ad	-	-	2	1	3	0,78
9 Blattodea lv	-	-	1	-	1	0,26
9 Cicadina lv	-	-	-	1	1	0,26
9 Isoptera	1	-	-	-	1	0,26
9 Lepidoptera ad	-	-	1	-	1	0,26
9 Mantodea	-	1	-	-	1	0,26
9 Odonata	-	-	-	1	1	0,26
9 Psocoptera	1	-	-	-	1	0,26
9 Saltatoria ad	-	-	1	-	1	0,26
total:	110	115	79	80	384	100 %

Table 26: **Activity density or emergence phenology in the ground photo-eclector – RS**
Dec. 9, 1975 - March 18, 1976: 1 E (Ind./1 m^2; collecting box + pitfall trap).
Dominance of groups on the total catch/month.
*without Formicoidea; + capture period 3 and 2 weeks respectively.

	rainy season					
	D+	J	F	M+	N	%
1 Diptera	260	503	120	75	958	67,94
2 Coleoptera ad	87	100	65	23	275	19,51
3 Araneae <5 mm	25	18	7	5	55	3,90
4 Hymenoptera*	20	16	11	2	49	3,48
5 Formicoidea	3	18	9	15	45	3,19
6 Saltatoria lv	-	2	3	4	9	0,64
7 Araneae > 5mm	3	2	-	-	5	0,36
8 Heteroptera ad	-	-	3	-	3	0,21
8 Lepidoptera ad	1	1	-	1	3	0,21
8 Pseudoscorpiones	2	1	-	-	3	0,21
9 Isoptera	-	-	2	-	2	0,14
10 Blattodea lv	-	-	-	1	1	0,07
10 Diplopoda	-	-	-	1	1	0,07
10 Cicadina ad	-	-	-	1	1	0,07
total:	401	661	220	128	1410	100 %

Coleoptera	D+	J	F	M+	N'	% N'
Staphylinidae	47	48	32	14	141	51,27
Carabidae	19	24	26	6	70	25,46
Curculionidae	2	-	-	-	2	0,73
Platypodidae	-	1	-	-	1	0,36
others	19	27	12	3	61	22,18

b) Other animal groups

Anura

3 species occurred in pitfall traps: *Elachistocleis ovalis* (one specimen in January (1976), *Leptodactylus wagneri* (one specimen in February and March each) and *Bufo marinus* (one specimen in March). These species have not been recorded on the trunk (comp. HEYER 1976).

Oligochaeta

3 species have been caught on the ground: *Pristina minuta* (Naididae), *Hemienchytraeus* (H.) *solimoes* n. sp. (Enchytraeidae) and *Dichogaster andina evae* (Octochaetidae; RIGHI 1978).

4. Comparison of the study areas

Both study areas differ from the geological and geomorphological viewpoints, in climate, in flora and in the arthropod fauna (see below). The vertebrate fauna was also quite dissimilar.

In the **Várzea** occurred, besides some small species, a large plant feeding lizard (*Iguana iguana*) in the canopy region (comp. BATES 1863/64). Sloths (*Bradypus variegatus*; det. R. BEST) were frequent (about 40 specimens/ha in the canopy region). They fed on the leaves of *Cecropia* spp., *Didimoponax* sp., *Laetia procera, Macrolobium acaciaefolium* and on leaf buds of *Pseudobombax munguba* (Table 3; comp. GOFFART 1971, MONTGOMERY et al. 1975). In the emersion phase, snakes were seen now and then on the forest floor (e. g. *Eucnetes murinus, Boa constrictor*). More rarely Erethizontidae (*Conus* sp.) were encountered, which fed on fruits in the canopy region. Remarkable was the species diversity of the avifauna. Besides numerous Picidae, small swarms of parrots (esp. Conurinae) could be observed, as well as Alcenidae (e. g. *Ceryle amazona, Ceryle aenea*), Icteridae (esp. *Cassicus cela*) and Opisthocomidae (*Opisthocomus cristatus*).

In the **Igapó** the avifauna was less diverse. Besides Alcenidae and Icteridae especially groups of *Crotophaga ani* (Cuculidae) were observed in the forest. Large lizards, snakes, sloths and Erethizontidae did not occur.

4.1. Animals on the ground, near the ground and strata-changers (Fauna of pitfall traps and ground photo-eclectors).

In the **Várzea** lived – based on the catch results and the above-mentioned groups disregarded – 4 - 6 times less arthropods on the ground than in the Igapó (Table 27, 28). In the very thin litter layer the condition for a rich soil life was very unfavorable here (comp. STRICKLAND 1947). Only Diptera, mostly Sciaridae, emerged in larger numbers.

Other primary decomposers (e. g. Isopoda, Diplopoda) were almost absent. Zoophagous groups dominated (e. g. Araneae, Carabidae, Staphylinidae), presumably mainly inhabitants of the trunk and canopy region (comp. IRMLER 1979a, b), which also came – like the Formicoidea – on to the forest floor during the emersion phase (comp. Fig. 20).

Table 27: **Activity density on the forest floor – TM : RS**
Dec. 5(8), 1975 - March 15(18), 1976 (total catch/pitfall trap; Pos. = position, rank).
χ^2**-test: total captures TM : RS**
S = sign. for $p < 0.01$; (S) = sign. for $p < 0.05$; NS = not significant.

	TM				RS		
	N/BoF	%	Pos.	χ^2	N/BoF	%	Pos.
Formicoidea	73	35.8	1	S	20	36,4	1
Coleoptera ad	60	29,4	2	S	15	27,3	2
Saltatoria lv	21	10,3	3	S	2	3,6	5
Araneae > 5 mm	10	4,9	4	NS	8	14,5	3
Blattodea lv	6	2,9	5	(S)	<1	<0,1	6
Araneae < 5 mm	5	2,5	6	NS	5	9,1	4
Diptera	5	2,5	6	NS	2	3,6	5
others	24	11,7	-	S	3	5,5	-
total:	204	100 %		S	55	100 %	

Table 28: **Activity density or emergence abundance in the ground photo-eclector – TM : RS**
Dec. 5(8), 1975 - March 15(18), 1976 (total catch/ground photo-eclector;
Pos. = position, rank); *without Formicoidea.
χ^2-test: total captures TM : RS
S = sign. for $p < 0.01$; (S) = sign. for $p < 0.05$; NS = not significant.

	TM				RS		
	N/E	%	Pos.	χ^2	N/E	%	Pos.
Coleoptera ad	2980	38,2	1	S	275	19.5	2
Diptera	2773	35,6	2	S	958	67,9	1
Araneae < 5 mm	493	6,3	3	S	55	3,9	3
Pseudoscorpiones	406	5,2	4	S	3	0,2	8
Hymenoptera*	296	3,8	5	S	49	3,5	4
Heteroptera ad	275	3,5	6	S	3	0,2	8
Symphyla	119	1,5	7	S	-	-	-
Lepidoptera ad	85	1,1	8	S	3	0,2	8
Formicoidea	78	1,0	9	S	45	3,2	5
Blattodea lv	73	0,9	10	S	1	0,1	9
Diplopoda	60	0,8	11	S	1	0,1	9
Cicadina ad	43	0,5	12	S	1	0,1	9
Saltatoria lv	28	0,4	13	S	9	0,6	6
Opiliones	21	0,3	14	S	-	-	-
Blattodea ad	19	0,2	15	S	-	-	-
Cicadina lv	18	0,2	16	S	-	-	-
Araneae > 5 mm	9	0,1	17	NS	5	0,4	7
Coleoptera lv	6	0,1	18	(S)	-	-	-
Meinertellidae	6	0,1	18	(S)	-	-	-
Psocoptera	6	0,1	18	(S)	-	-	-
others	10	0,1	-	(S)	2	0,1	-
total:	7800	100 %		S	1410	100 %	

In the **Igapó**, the falling high water left a dense litter layer behind, which was soon colonized by numerous arthropods (Table 27, 28). They were mainly insect imagines with soil living development stages (esp. Diptera, Coleoptera) but also inhabitants of the trunk and canopy region (esp. Formicoidea). In the rainy season Araneae, Pseudoscorpiones, Symphyla and Diplopoda also occurred.

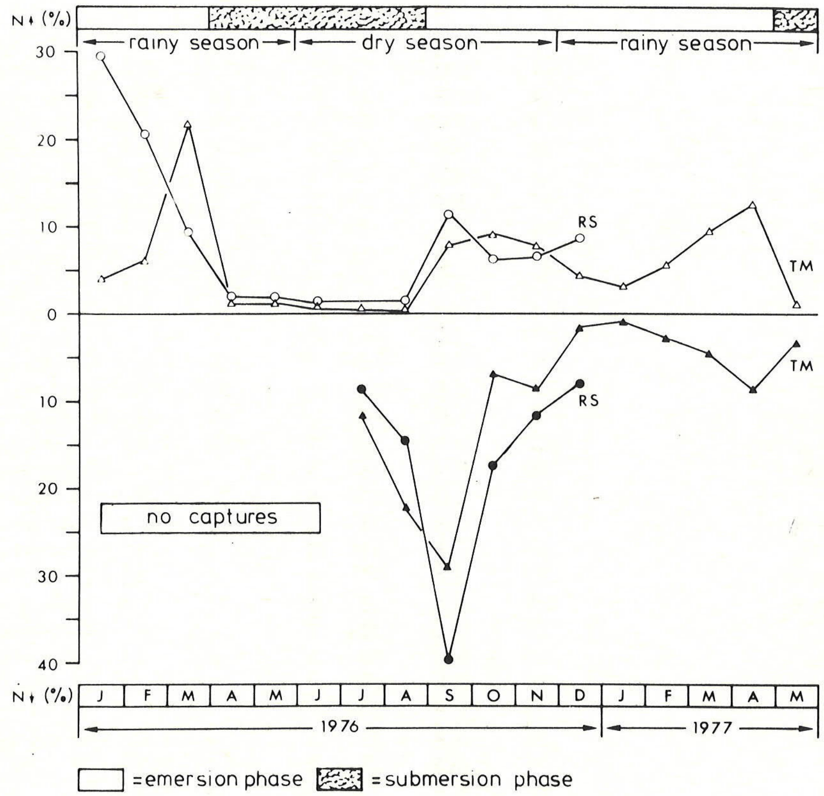

Fig. 20: Trunk migration (upwards/downwards) and trunk approach (3 BE each) at Tarumã Mirím River (TM) and on Curarí Island (RS).
January 1976 - May 1977. N↑ and N↓ = 100 % each.
Not included are: Acari, Collembola, Thysanoptera and Diptera.

Table 29: **Trunk migration (upwards) and trunk approach TM : RS**
Jan. - Dec. 1976 (total catch/arboreal photo-eclector (without Diptera);
Pos. = position, rank); * without Formicoidea.
χ^2-test: total captures TM : RS
S = sign. for $p < 0.01$; NS = not significant.

	TM				RS		
	N/BE↑	%	Pos.	χ^2	N/BE↑	%	Pos.
Formicoidea	6564	39,5	1	S	6929	80,6	1
Pseudoscorpiones	2811	16,9	2	S	18	0,2	13
Araneae < 5 mm	2212	13,3	3	S	371	4,3	3
Coleoptera ad	779	4,7	4	S	654	7,6	2
Cicadina lv	715	4,3	5	S	33	0,4	9
Isopoda	502	3,0	6	S	< 1	< 0,1	18
Diplopoda	429	2,6	7	S	< 1	< 0,1	18
Chilopoda	367	2,2	8	S	2	< 0,1	16
Araneae > 5 mm	338	2,0	9	S	146	1,7	5
Psocoptera	304	1,8	10	S	40	0,5	7
Symphyla	298	1,8	11	S	-	-	-
Saltatoria (ad + lv)	291	1,8	12	S	158	1,8	4
Blattodea lv	233	1,4	13	S	98	1,1	6
Hymenoptera *	165	1,0	14	S	38	0,4	8
Heteroptera lv	121	0,7	15	S	20	0,2	12
Meinertellidae	96	0,6	16	S	-	-	-
Mantidea	81	0,5	17	S	22	0,3	11
Heteroptera ad	40	0,2	18	S	4	0,1	16
Coleoptera lv	33	0,2	19	S	< 1	< 0,1	18
Lepidoptera lv	31	0,2	20	S	8	0,1	15
Lepidoptera ad	29	0,2	21	NS	27	0,3	10
Uropygi	28	0,2	22	S	-	-	-
Cicadina ad	27	0,2	23	S	10	0,1	14
Aphidoidea	26	0,2	24	S	1	< 0,1	17
Embioptera	26	0,2	24	S	-	-	-
Blattodea ad	25	0,2	25	S	8	0,1	15
Opiliones	10	< 0,1	26	S	< 1	< 0,1	18
Isoptera	9	< 0,1	27	NS	4	0,1	16
Phasmatodea	7	< 0,1	28	S	-	-	-
others	13	< 0,1	-	NS	11	0,1	-
total:	16610	100 %		S	8602	100 %	

Table 30: **Trunk migration (downwards) and trunk approach TM : RS**
July - Dec. 1976 (total catch/arboreal photo-eclector (without Diptera);
Pos. = position, rank); *without Formicoidea.
χ^2-test: total captures TM : RS
S = sign. for $p < 0.01$; (S) = sign. for $p < 0.05$; NS = not significant.

	TM				RS		
	N/BE↓	%	Pos.	χ^2	N/BE↓	%	Pos.
Formicoidea	3545	25,3	1	NS	3531	55,6	1
Diplopoda	3426	24,4	2	S	19	0,3	10
Pseudoscorpiones	3087	22,0	3	S	61	1,0	8
Araneae < 5 mm	948	6,8	4	S	183	2,9	4
Chilopoda	909	6,5	5	S	22	0,3	9
Coleoptera ad	569	4,1	6	S	1776	28,0	2
Symphyla	392	2,8	7	S	2	< 0,1	16
Isoptera	370	2,6	8	S	122	1,9	6
Opiliones	261	1,9	9	S	< 1	<0,1	17
Uropygi	112	0,8	10	S	-	-	-
Araneae > 5 mm	80	0,6	11	S	61	1,0	8
Coleoptera lv	56	0,4	12	S	271	4,3	3
Meinertellidae	44	0,3	13	S	-	-	-
Hymenoptera*	29	0,2	14	(S)	19	0,3	10
Heteroptera ad	23	0,2	15	(S)	14	0,2	11
Psocoptera	22	0,2	16	S	76	1,2	7
Lepidoptera lv	22	0,2	16	S	7	0,1	13
Blattodea lv	21	0,1	17	S	7	0,1	13
Lepidoptera ad	21	0,1	17	S	140	2,2	5
Diptera lv	19	0,1	18	S	-	-	-
Isopoda	17	0,1	19	S	-	-	-
Embioptera	12	<0,1	20	S	-	-	-
Blattodea ad	12	<0,1	20	NS	5	<0,1	15
Nicoletiidae	9	< 0,1	21	S	-	-	-
Saltaoria	9	<0,1	21	NS	5	<0,1	15
Cicadina ad	8	<0,1	22	NS	11	0,2	12
Heteroptera lv	7	<0,1	23	NS	6	0,1	14
others	5	<0,1	-	NS	10	0,2	-
total:	14035	100 %		S	6348	100 %	

4.2. Animals on the trunk (Catches in arboreal photo-eclectors)

In the **Igapó** lived – based on the catch results and the above-mentioned groups disregarded – about twice as many animals on the trunk as in the Várzea (Table 29, 30). Characteristic were annual-periodical migrations up and down the trunk. During the rainy season many arthropods migrated into the trunk and canopy region. At the beginning of the emersion phase they came back on to the forest floor (Fig. 20).

In the **Várzea** typical soil-arthropods only occurred sporadically on the trunk (Table 29, 30).

During the emersion phase, especially in the dry season, Formicoidea dominated on both experimental areas. They represented mostly arboricole species. These migrated – like the Araneae of the Várzea (see above) – between canopy, trunk region and forest floor (Fig. 20). Coleoptera were also frequent, e. g. bark breeding Platypodidae and Scolytidae, besides Carabidae, Staphylinidae and Curculionidae (comp. Table 5, Table 14). Diptera, which emerged on the forest floor, reached – based on first in vestigations – the trunk region to. During the rainy season, their dominance on the total upward migration and trunk approach was about 3,4 - 4,6 % in the Igapó and about 9 % in the Várzea (comp. Table 6, ADIS 1977a). In the Igapó Cecidomyiidae dominated; in the Várzea Sciaridae.

5. Discussion

5.1. Data value of the capturing methods

Effectivity and data value of the capture devices are quite different (ADIS 1979; ALBERT 1976; FUNKE 1971, 1979; GRIMM et al. 1975; HARTMANN 1976; THIEDE 1977; WEIDEMANN 1971).

Pitfall traps, above all, detect animals of the soil surface. In the inundation-forest, inhabitants of other strata have only been caught sporadically (see e.g. Pseudoscorpiones, Symphyla, Table 20, 25; comp. BECK 1976).

Ground photo-eclectors are very catch-effective (comp. Table 27, 28). According to FUNKE (see THIEDE 1977) strata changing insect imagines as well as species which are active in the air space near the soil (both with terricole larval stages) are almost all caught. For many arthropods which live in or on the soil, captures of ground photo-eclectors only give indications of an "activity density in closed rooms". In the inundation-forest almost 99 % of all specimens caught were captured in the collecting boxes. Pitfall traps of the ground photo-eclectors mainly caught Formicoidea. In the Várzea, epedaphic and epigaeic (only temporarily edaphic) arthropods presumably were almost all caught, because of the special soil structure. In the Igapó, Uropygi, Isopoda and Colobognatha were absent; Chilopoda and Juliformia were rare. These groups mostly occurred with frequency on the trunk. On the forest floor some of them have only been found in litter samples and aspirator captures so far (BECK 1971, 1972; IRMLER 1976). Arthropods which live in special microhabitats on the forest floor, as for example in fallen fruits (e. g. of *Aldina latifolia*) or in dead wood are scarcely caught (e. g. Dermaptera). Based on the capture results, non-flying arthropods were distributed unequally, especially in the Igapó. – From the canopy, arthropods dropped continuously on to the forest floor. Directly after the position of the ground photo-eclectors had been changed (every 5 weeks), Meinertellidae, Formicoidea as well as Staphylinidae, Curculionidae and Elateroidea were caught 2 - 3 times more frequently than during intermediate periods (comp. THIEDE 1977).

Arboreal photo-eclectors contributed most to the qualitative detection of the arthropod-fauna in inundation-forests (comp. Table 29, 30). Trunk migration (upwards/downwards) and trunk approach were undoubtedly dependent on the thickness and bark structure of trunks, the structure of the trunk base, the "space resistance" of the soil (herb layer, litter) and the distance of trunks to each other (comp. FUNKE 1979). Differences in capture results are to be found between tree species (Table 31 - 33, Fig. 21). However, the preference of Formicoidea for *P. munguba* I (Table 31) during trunk descents seems to be insignificant and was presumably caused by a coincidental high occurrence (nests in the canopy!). Trunk ascent and trunk approach of all arthropods seem to be correlated with the trunk circumference (Table 31, Fig. 21). Remarkable is the preference of Staphylinidae in the Várzea for the thinnest trunk, probably related to the bark structure. In the Igapó the different and partially trunk specific capture results could only possibly be explained, if the catchment area of the buttresses of each capturing tree could have been determined. Thus the trunk ascent of arthropods is quite confusing (comp. Table 32, 33). The behaviour of Pseudoscorpiones probably indicates a preference for trunks with bark coming off the stem. Symphyla perhaps prefered bark with longitudinal cracks. Within the Isopoda, water capacity of the bark may have been decisive, within the Staphylinidae probably a high availability of prey. Terricole Formicoidea eventually followed the most distinct buttresses to the trunk.

Non-flying animals apparently got into arboreal photo-eclectors for downward migrations during their trunk ascent as well, mainly within the rainy season. This seems especially to be true for Formicoidea, and in the Igapó also for Pseudoscorpiones, Isopoda, Pseudonannolenidae and Symphyla. Perhaps arthropods migrating down the trunk got – particularly at the beginning of the emersion phase – sporadically into arboreal photo-eclectors for upward migrations, too (comp. FUNKE 1971).

In the Igapó, animals with a high locomotor activity presumably reached the trunk area of the capturing tree also via the canopy region. Some insects, which temporarily flew in large numbers in the forest, seemed to avoid the funnel region of the trap (e. g., butterflies in the Igapó and Cicindelidae in the Várzea; comp. IRMLER 1973). During heavy rains, Isoptera of the canopy and trunk region were washed down the stems, obviously together with their galleries.

Table 31: **Trunk migration (upwards/downwards) and trunk approach RS to tree species (3 BE each).**
Specimens/month of total Arthropoda, some orders and families.
Pos. = position (rank); U. = trunk circumference (cm) at breast height.

tree species		trunk migration-downwards (July - Oct. 1976) A	S	O	N	D	N↑	%	Pos.	U	trunk migration-upwards (Aug. - Dec. 1976) J	A	S	O	N↓	%	Pos.	U.
Arthropoda																		
P. munguba I		239	1604	1104	989	550	4486	50,1	1	270	557	1210	6328	2187	10282	67,5	1	230
P. munguba II		58	988	322	426	1577	3371	37,6	2	210	407	771	548	304	2030	13,3	3	210
Ficus sp.		36	347	234	304	176	1097	12,3	3	170	650	780	660	829	2919	19,2	2	220
	Σ	333	2939	1660	1719	2303	8954	100 %			1614	2761	7536	3320	15231	100 %		
Formicoidea																		
P. munguba I		183	1412	928	829	473	3825	57,3	1	270	160	369	5642	1149	7320	76,9	1	230
P. munguba II		24	841	265	378	640	2148	32,1	2	210	68	419	172	163	822	8,6	3	210
Ficus sp.		10	253	143	201	103	710	10,6	3	170	200	388	284	506	1378	14,5	2	220
	Σ	217	2506	1336	1408	1216	6683	100 %			428	1176	6098	1818	9520	100 %		
Araneae < 5mm																		
P. munguba I		14	59	56	55	19	203	53,1	1	270	28	36	76	32	172	38,4	2	230
P. munguba II		18	47	20	18	18	121	31,7	2	210	32	26	35	8	101	22,5	3	210
Ficus sp.		4	21	19	11	3	58	15,2	3	170	49	34	60	32	175	39,1	1	220
	Σ	36	127	95	84	40	382	100 %			109	96	171	72	448	100 %		
Lepidoptera ad																		
P. munguba I		10	4	2	1	-	17	37,0	2	270	26	83	19	1	129	32,5	2	230
P. munguba II		6	2	2	1	-	11	23,9	3	210	18	113	21	1	153	38,5	1	210
Ficus sp.		12	4	1	1	-	18	39,1	1	170	28	65	19	3	115	29,0	3	220
	Σ	28	10	5	3	-	46	100 %			72	261	59	5	397	100 %		
Staphylinidae																		
P. munguba I		7	5	6	1	-	19	18,8	2	270	139	32	21	14	206	33,7	2	230
P. munguba II		-	1	-	-	-	1	1,0	3	210	61	29	21	16	127	20,8	3	210
Ficus sp.		1	10	24	17	29	81	80,2	1	170	184	70	16	8	278	45,5	1	220
	Σ	8	16	30	18	29	101	100 %			384	131	58	38	611	100 %		
Carabidae																		
P. munguba I		1	-	-	1	-	2	40,0	1	270	4	164	38	14	220	57,3	1	230
P. munguba II		-	1	-	-	1	2	40,0	1	210	2	25	29	16	72	18,7	3	210
Ficus sp.		-	-	-	-	1	1	20,0	2	170	14	37	27	14	92	24,0	2	220
	Σ	1	1	-	1	2	5	100 %			20	226	94	44	384	100 %		

Table 32: **Trunk migration (upwards/downwards) and trunk approach TM of some arthropod groups to tree species (3 BE each).**
Pos. = position (rank); U. = trunk circumference (cm) at breast height.

	tree species	trunk migration-upwards (July 1976 - May 1977) N↑	%	Pos.	U.	trunk migration downwards (July - Oct. 1976) N↓	%	Pos.	U.
Formicoidea	A. latifolia I	4486	21,3	3	219	4544	66,3	1	290
	A. latifolia II	8198	39,1	2	240	656	9,6	3	250
	P. venosa	8310	39,6	1	190	-	-	-	-
	M. paraensis	-	-	-	-	1655	24,1	2	230
	Σ	20976	100 %			6855	100 %		
Pseudoscorpiones	A. latifolia I	428	15,6	3	219	4142	44,9	1	290
	A. latifolia II	1855	67,7	1	240	3820	41,4	2	250
	P. venosa	456	16,7	2	190	-	-	-	-
	M. paraensis	-	-	-	-	1264	13,7	3	230
	Σ	2739	100 %			9226	100 %		
Araneae < 5 mm	A. latifolia I	2736	48,0	1	219	1174	42,1	1	290
	A. latifolia II	1357	23,8	3	240	1021	36,7	2	250
	P. venosa	1609	28,2	2	190	-	-	-	-
	M. paraensis	-	-	-	-	590	21,2	3	230
	Σ	5702	100 %			2785	100 %		
Symphyla	A. latifolia I	1568	57,4	1	219	467	39,8	1	290
	A. latifolia II	908	33,2	2	240	260	22,1	3	250
	P. venosa	257	9,4	3	190	-	-	-	-
	M. paraensis	-	-	-	-	448	38,1	2	230
	Σ	2733	100 %			1175	100 %		
Isopoda	A. latifolia I	155	12,0	3	219	3	6,0	3	290
	A. latifolia II	205	15,8	2	240	10	20,0	2	250
	P. venosa	935	72,2	1	190	-	-	-	-
	M. paraensis	-	-	-	-	37	74,0	1	230
	Σ	1295	100 %			50	100 %		
Staphylinidae	A. latifolia I	112	84,2	1	219	43	33,3	2	290
	A. latifolia II	9	6,8	3	240	37	28,7	3	250
	P. venosa	12	9,0	2	190	-	-	-	-
	M. paraensis	-	-	-	-	49	38,0	1	230
	Σ	133	100 %			129	100 %		
Carabidae	A. latifolia I	15	71,4	1	219	64	32,0	2	290
	A. latifolia II	4	19,1	2	240	76	38,0	1	250
	P. venosa	2	9,5	3	190	-	-	-	-
	M. paraensis	-	-	-	-	60	30,0	3	230
	Σ	21	100 %			200	100 %		

Table 33: **Trunk migration (upwards) of some species of Pseudoscorpiones and Formicoidea (Ind./month; Jan. - May 1976/77; 3 BE).**
Pos. = position (rank); U. = trunk circumference (cm) at breast height; *new species described by MAHNERT (1979).

	tree species	trunk migration 1976 – upwards J	F	M	A	M	N↑	%	Pos.	U.	trunk migration 1977 – upwards J	F	M	A	M	N↑	%	Pos.	U.
Pseudoscorpiones*																			
Brazilatemnus browni Muchmore	A. latifolia I	-	-	223	74	64	361	20,7	3	219	-	26	64	50	1	141	55,1	1	219
	A. latifolia II	-	-	293	104	498	895	51,4	1	240	-	1	45	53	2	101	39,4	2	240
	P. venosa	-	-	402	50	33	485	27,9	2	190	-	-	7	7	-	14	5,4	3	190
	Σ	-	-	918	228	595	1741	100 %			-	27	116	110	3	256	100 %		
Tyrannochthonius amazonicus n. sp.	A. latifolia I	4	30	75	1	-	110	3,2	3	219	8	16	45	28	-	97	5,3	3	219
	A. latifolia II	47	927	2146	3	1	3142	91,9	1	240	44	251	566	500	2	1363	74,0	1	240
	P. venosa	8	72	87	-	-	167	4,9	2	190	3	98	169	111	1	382	20,7	2	190
	Σ	59	1029	2308	4	1	3401	100 %			55	365	780	639	3	1842	100 %		
Trannochthonius migrans n. sp.	A. latifolia I	41	250	492	2	-	785	28,9	3	219	-	9	64	41	-	114	25,0	2	219
	A. latifolia II	79	262	665	-	-	1006	37,1	1	240	-	2	4	4	-	10	2,2	3	240
	P. venosa	8	225	689	2	-	924	34,0	2	190	-	27	168	137	-	332	72,8	1	190
	Σ	128	737	1846	4	-	2751	100 %			-	38	236	182	-	456	100 %		
Formicoidea																			
Wasmannia rochai Forel	A. latifolia I	50	102	123	-	-	275	25,4	2	219									
	A. latifolia II	164	204	245	-	-	613	56,7	1	240									
	P. venosa	95	55	44	-	-	194	17,9	3	190									
	Σ	309	361	412	-	-	1082	100 %											
Hipoclinea	A. latifolia I	59	75	75	-	-	209	40,0	1	219									
	A. latifolia II	56	38	61	-	-	155	29,6	3	240									
	P. venosa	110	28	21	-	-	159	30,4	2	190									
	Σ	225	141	157	-	-	523	100 %			not evaluated								
Daceton armigerum (Latr.)	A. latifolia I	18	15	17	3	2	55	25,1	2	219									
	A. latifolia II	-	-	-	-	-	-	-	-	240									
	P. venosa	52	39	65	6	2	164	74,9	1	190									
	Σ	70	54	82	9	4	219	100 %											
Labidus praedator (F. Smith)*	A. latifolia I	-	-	-	-	-	-	-	-	219									
	A. latifolia II	-	-	96	-	-	96	100,0	1	240									
	P. venosa	-	-	-	-	-	-	-	-	190									
	Σ	-	-	96	-	-	96	100 %											
Gnamptogenys striatula Mayr*	A. latifolia I	-	-	-	1	-	1	5,6	2	219									
	A. latifolia II	-	-	-	15	1	16	88,8	1	240									
	P. venosa	-	-	-	1	-	1	5,6	2	190									
	Σ	-	-	-	17	1	18	100 %											

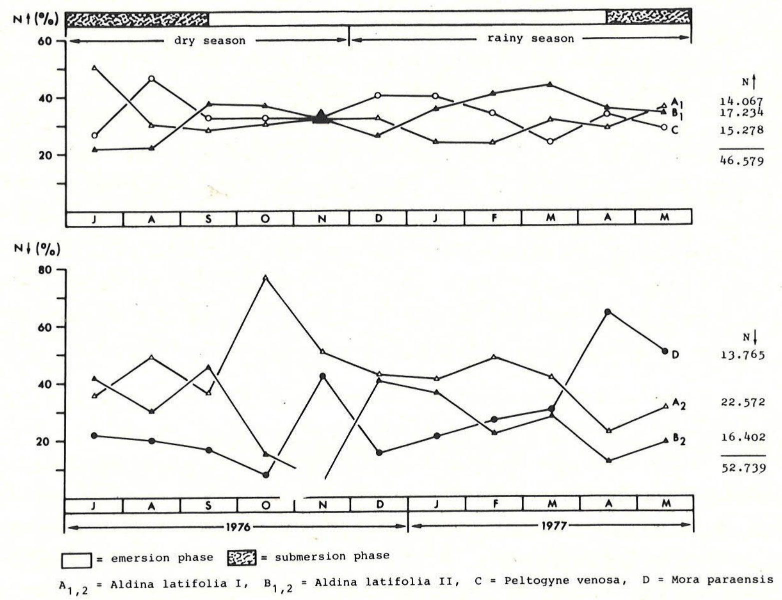

Fig. 21: Trunk migration (upwards/downwards) and trunk approach of arthropods (3 BE each) at Tarumã Mirím River to tree species (A - D).
N ↑/month and N ↓/ month = 100 % each.
Not included are: Acari, Collembola, Thysanoptera and Diptera.
U. = trunk circumference (cm) at breast height.

5.2. Discussion of the results

No other neotropical land-ecosystem with similar extensive data on arthropod populations has yet been evaluated. The extraordinary extent of this task forced some compromises on the practical work in the field and on the material evaluation. Within the first year (1976), insights into dominance, phenology and activity dynamics of terrestrial arthropods were gained for two entirely different types of inundation-forests. In the second year (1977) investigations particularly dealt with the Igapó. The main task there was the study of vertical migrations of arthropods under the influence of changing water-levels. It was hoped that the captured material could be separated into the smallest possible systematic units. However, to date only a few groups have been identified to genus or species, in spite of the cooperation of numerous taxonomists. It has to be assumed that about 75 % of the species captured are new to science. Only for Formicoidea are there numerous taxonomic data available, particularly from Amazonian rain-forests (comp. KEMPF 1972).

Within this study many questions remain unsolved. Investigations into the emergence abundance of insect-imagines and the total extent of vertical migrations (including the Thysanoptera, Diptera, Acari and particularly the Collembola) are only beginning. Statements on the "production of insect-imagines", supplemented by the "biomass of all other arthropods captured per m^2 and year in ground photo-eclectors", which in the sense of FUNKE (1973, 1977a) represent "basic values to estimate energy-flows within arthropod-cenoses" are totally missing. The function of distinct populations in ecosystems is only now being clarified in Central European forests (comp. FUNKE 1977a; ALTMÜLLER 1977; HERLITZIUS 1977). However, even without functional aspects, the results herein offer numerous suggestions for further studies. Following the model developed for Pseudoscorpiones, valuable data about activities on soil and trunk, as well as important information on development cycles can still be obtained for other groups (and species). Furthermore, this has to be done before we can understand more fundamentally the correlation between increasing and decreasing water-level and the interconnected complex of circumstances on the one hand, and the trunk migration (upwards/downwards) and trunk approach on the other hand.

Annual vertical migrations of arthropods in inundation-forests

Tarumã Mirím River (Igapó)

Horizontal migrations of soil arthropods prior to the increasing flood occur to a very limited extend, as shown by BECK (1969, 1970, 1971, 1972, 1976) and IRMLER (1976, 1978). The "macrofauna of the soil" is said to move only short distances, depending on its mobility, and perishes "catastrophically" during inundation, with few exceptions. BECK and IRMLER suppose, that recolonization of inundation-forests at the beginning of the emersion phase mainly takes place from outside by immigration of animals on the soil or by animals flying-in from adjacent (dry land) biotopes and from the waterline of the flood (comp. BECK 1971, 1976; IRMLER 1976, 1978, 1979a, b).

Based on the results of this study, numerous arthropods, particularly **non-flying arthropods**, seem to outlast inundation in the trunk and canopy region. However, a great part of them are obviously destroyed, so far as they do not have durable submersion development stages. This statement is based on the following results: During the emersion phase of 1976/77 about 1.400 soil arthropods (broad sense; nonmigrantes, migrantes) were caught per m^2 on the forest floor. Out of these groups only 10.500 animals were captured per trunk. The catchment area of one trunk (capturing tree) encompasses more than 50 m^2. If the "catch efficiency" of a single capturing tree in Central European forests is used to assess tropical rain-forest, only up to 35 % of trunk ascending arthropods have surmounted the barrier "arboreal photo-eclector" and have reached higher regions of trunk and canopy (based on results with two funnel rings mounted upon another in 2 and 4 m height; see FUNKE 1971, 1977b, 1979). Even if the above mentioned catch number would be considered 2 - 3 times higher, the discrepancy of the capturing results between ground photo-eclector and arboreal photo-eclector remains obvious. With *Tyrannochthonius amazonicus* for example, about 790 tritonymphs were caught per m^2 on the forest floor and only 617 per capturing tree between September 1976 and April 1977.

Many arthropods undoubtedly climb up the numerous thin trees on the experimental area as well (comp. Fig. 3). However, their numbers have not been considered very large, due to observations of FUNKE and collaborators in young beech forests of the Solling in West Germany (high trunk density, low trunk circumferences). According to FUNKE (pers. commun.) this number may be set proportional to upward migrations on thick trunks, related to circumference and surface area. Probably it is still lower, because of the inferior "orientation value" of thin trunks and the smaller extension of the trunk base.

On the basis of all these observations (see above), the destruction of a greater part of the non-flying arthropod populations during inundation can be considered as certain. However, the quite small upward migration on the trunk is still not yet fully explained. According to FUNKE (1971, 1979), FUNKE and SAMMER (1980) numerous arthropods of Central European forests orient themselves on the soil to trunk silhouettes. Some of them therefore escape drowning, which happens in heavy drenched soils after long lasting rainfalls or from inundations, e. g. of floodplain forests (FUNKE, pers. comm.). A quite similar situation exists in Amazonian inundation-forests. Here as well; numerous arthropods find a refuge on trunks (comp. IRMLER 1973), some even from the water-surface (SCHALLER 1969), due to their distant scototactic behaviour. However, during the "escape prior to water" they get into a new dangerous situation: they fall victim to predaceous arthropods and reach higher trunk regions (and the capturing funnels of arboreal photo-eclectors as well) only in relatively low numbers. Predators form a barrier in the lower trunk region, which is very difficult to surmount. This is also evident in Table 5: about 2/3 of all animal groups cited on page / are predaceous arthropods. Particularly the Formicoidea are temporarily very effective predators and probably capture numerous arthropods for the demands of nest associates and brood (in certain cases high up in the trees). Besides termites they presumably represent the only group at all which -- may surmount the capturing area of an arboreal photo-eclector due to their trace secretions and guide new individuals to the rich food sources just above the water-level.

If this situation is considered, it becomes evident, that the actual trunk ascent and trunk approach of arthropods in the lower stem region must be considerably higher than revealed by the catching results. Furthermore it has to be considered, that the stems of numerous trees in the Igapó, particularly of buttressed ones, are hollow (up to 15 m height). Some arthropods may therefore enter the trunk by holes in the stem and root system near the ground and survive inundation inside the trunk as well.

Several groups which have reached the trunk and canopy region, here apparently pass through a reproduction phase during the submersion period (e. g. Chilopoda, Colobognatha, Pseudoscorpiones; comp. Table 5), others are heavily decimated again (e. g. Isopoda, small spiders; comp. Pseudoscorpiones). The "hanging soils" in the canopy probably also serve as refuge and reproduction places (comp. DELAMARE-DEBOUTTEVILLE 1951, KLINGE 1966). Recolonization of the forest floor is presumed to take place from here too.

Trunk migrations (upwards/downwards) and trunk approaches are undoubtedly regulated to a great extent by abiotic factors changing with the climate (dry season/rainy season). During trunk ascents and approaches, hygrophilous species are certainly influenced by increasing wetness on the forest floor and increasing rel. humidity in the trunk region, more meso-xerophilous species are influenced by a dry-warm climate in the forest stand. Vertical migration of arthropods ahead of the water during flooding is only shown for a few groups. Preferences for dryness of humidity become also evident during trunk descents.

Formicoidea for example are highly active within the dry season, at the beginning of the emersion phase.

The non-flying and limited flying arthropod-fauna of the Igapó can be classified – all results up to now taken into consideration – into the following groups:

1. Terricole arthropods

a) "Soil animals – nonmigrants":

Reproduction exclusively on the forest-floor; temporarily or not at all active in the lower trunk region during the emersion phase; adults or eggs outlast inundation in or on the soil (dormancy!) or under loose bark in the flooded trunk region.

e.g. *Rostrocoetes foveolatus* and other Oribatidae (BECK 1969, 1972); diverse Collembola, esp. Entomobryomorpha (BECK 1976).

b) **"Soil animals – migrants"**:

Reproduction mainly on the forest floor; tree-living stages during the submersion phase; trunk migration (upwards/downwards) of some or all stages; upward migration mainly with the beginning of the rainy season, rarely just before inundation of the forest floor.

e.g. *Pachyolpium irmgardae, Tyrannochthonius amazonicus, Tyrannochthonius migrans* (Pseudoscorphiones); *Hanseniella arborea* (Symphyla); Oniscoidea, Geophilomorpha, and others.

2. Arboricole arthropods

a) "Tree animals – nonmigrants"

Reproduction exclusively in the trunk and canopy region; at most temporarily or not at all active on the forest floor during the emersion phase.

e.g. *Epinannolene* n. sp. (Diplopoda), diverse Embioptera, Isoptera, Psocoptera, most Formicoidea, and others.

b) **"Tree animals – migrants"**:

Reproduction mostly in the trunk and canopy region; ground-living stages during the emersion phase; trunk migration (upwards/downwards) of some stages.

e.g. *Brazilatemnus browni* (Pseudoscorpiones); *Neomachilellus adisi, Neomachilellus scandens* (Meinertellidae) and others.

Statements on the habitat of **flying arthropods** during the submersion phase are extremely difficult, because of the lack of knowledge about their mode of life. A distinct trunk ascent and trunk approach of groups during the rainy season (see above) has not been observed here. On the forest floor, particularly Coleoptera are quite frequent before inundation of the experimental area. This is especially true for Carabidae and Staphylinidae (comp. Table 22). According to IRMLER (1979a) terricole species of these families show quite different "reactions" to annual water-fluctuations. Some apparently live permanently at the waterline and make horizontal migrations on the ground, according to water-level fluctuations. Other search for adjacent (dry land) biotopes during inundation. Several species colonize the trunk and canopy region.

The development cycle of all holometabolous insects with terricole larval stages has to be adapted to the abiotic conditions. This signifies:

1. The development "egg-imago" takes six months at most (comp. IRMLER 1978); it is well synchronized with the emersion phase.

a) Imagines outlast the submersion phase on the trunk (e. g. in small hollow spaces – quiescence, diapause).

b) Imagines colonize the canopy region, particularly the "hanging soils" (new generation? ; comp. IRMLER 1979a).

2. The development "egg-imago" takes six months at most; it is only partially synchronized with the emersion phase. Eggs and probably young larvae are flood-resistant (comp. BECK 1976; IRMLER 1979a), some larvae possibly are fully active (at litter decomposition?).

3. During the emersion phase several (numerous) generations succeed one another in short intervals. This situation probably comes true for Diptera with saprophagous larvae and for Coleoptera with larvae of a similar trophic level (comp. IRMLER 1978). From this would result a constant increase of the imaginal populations towards the end of the emersion phase. It actually happens with Diptera and Coleoptera (see Table 22; comp. IRMLER 1976). With the high reproduction potential of some of these animals (quick successive generations and probably large numbers of descendants) a very small number of imagines would already be sufficient, to reactivate the colonization-cycle on the forest floor. These few imagines would have to be descendants of those animals, which "outlasted" the submersion phase in dry land biotopes, "hanging soils" – probably also with several generations succeding one another – or on the trunk (see above).

4. The development "egg-imago" takes place in the canopy region, especially in the "hanging soils" or outside the Igapó (e.g. in "Terra firme" forests). During the emersion phase, the imagines temporarily come on to the forest floor or into the inundation-forest. Trunk approach of, e.g., Coleoptera is particularly distinct during the emersion phase (comp. Table 5). IRMLER (1979a) refers to arboricole Staphylinidae and observes the limited time appearance of several species of Carabidae, Scarabeidae and Staphylinidae.

A different situation is obtained within the Hemimetabola. They presumably have their main development in the trunk and canopy region. That is, during upward migrations on the trunk juvenile stages particularly are being caught (comp. Table 5).

Flying arthropods get into arboreal photo-eclectors during trunk migrations (upwards/downwards) as well during trunk approaches. Interpretation of catches is therefore more difficult. High mobility and the different mode of life of many arthropods result in a different "use" of the trunk area. According to FUNKE (1977b, 1979) these areas serve in Central European forests as

a) settlement area for animals feeding on growths and debris,
b) hunting-ground for predaceous arthropods,
c) refugia for soil animals,
d) resting place for flying insects,
e) approach locality for insects of specific biochores,
f) approach locality for animals passing through and immigrants,
g) transit zone for canopy inhabitants
– with soil-living development stages for oviposition and maturity-feeding;
– with main development in the canopy;
– with development possibilities in various strata.

All these categories also are true for inundation-forests. Groups of social insects, which rarely attain major importance in decidious and coniferous forests of temporary zones and "debris feeders" on thin bark and rind have to be added here. These are rare on healthy trunks in temporary zones, but are represented in the Igapó, especially by termites. "Growth feeders" are of great importance, with regard to the high abundance of epiphytes in the canopy region.

Curarí Island (Várzea)

Arthropods of the Várzea quite obviously live mostly in the trunk and canopy region (comp. IRMLER 1979a). Presumably, this is true for Acari and Collembola as well. During the emersion phase numerous animals come on to the forest floor for oviposition (e. g. Diptera) or nutrition (esp. Formicoidea). Non-flying soil arthropods (in a broad sense) are rare. Obviously almost all groups survive the submersion phase in the trunk and canopy region. Emigration and immigration of arthropods are undoubtedly more difficult, at least during high water. However, extensive migrations of flying insects cannot be excluded (comp. IRMLER 1979a).

6. Summary

"Reactions" of animal populations in Central Amazonian inundation-forests to annual flooding have been poorly investigated.

The terrestrial arthropod-fauna was studied in 1976 in a Várzea-forest (white-water region) and in 1976/77 in an Igapó-forest (black-water region) near Manaus. As capture devices ground photo-eclectors, pitfall traps and arboreal photo-eclectors were used. All captured animals have been registered and separated to order, family and in some cases to species, except Collembola, Acari, Thysanoptera and part of the Diptera.

Igapó

1. In the trunk region about 127.000 arthropods were caught (46 % Insecta – mainly Holometabola –, 32 % Arachnida, 22 % Isopoda and Myriapoda). Formicoidea dominated (71 species), as well as Pseudoscorpiones, Araneae and Diplopoda. On the forest floor about 80.000 arthropods were captured (90 % Insecta – mostly Holometabola –, 9 % Arachnida, 1 % Isopoda and Myriapoda).

2. Activity density and emergence abundance of arthropods change throughout the year. In the dry season holometabole insects dominate, in the rainy season Arachnida, Myriapoda and Isopoda dominate on forest-floor and trunk.

3. Numerous arthropods, particularly non-flying ones obviously survive the submersion phase (March/April - Aug./Sept.) in the trunk and canopy region. However, a great part of them perish during the actual inundation, many become prey to predaceous arthropods, particularly of Formicoidea. With the beginning of the rainy season (in Dec.) upward migration on the trunk increases as well as downward migration near the end of the submersion phase, particularly of Arachnida and Myriapoda. Trunk migration (upwards/downwards) and flight activity to trunks (=trunk approach) are regulated in a high degree by abiotical factors (soil wetness, rel. humidity) changing with the climate (dry season/rainy season)

4. Development of many arthropods is well synchronized with the annual water-fluctuations. This is exemplarily shown for Pseudoscorpiones (18 species in 8 families, litter and bark inhabitants) and Meinertellidae (2 species).

5. The non-flying and limited-flying arthropod fauna of the Igapó is classified into terricole and arboricole groups ("nonmigrants", "migrants").

Várzea

1. About 45.000 arthropods were captured in the trunk region (94 % Insecta – mainly Formicoidea as well as Coleoptera –, 5,7 % Arachnida, 0,3 % Isopoda and Myriapoda. About 2.000 animals were caught on the forest floor (91,1 % Insecta – mostly Holometabola –, 8,3 % Araneae, 0,6 % Myriapoda).

2. Arthropods of the Várzea presumably are mostly trunk and canopy inhabitants. Many of them also come on to the forest floor during the emersion phase for oviposition (esp. Diptera) or nutrition (esp. Formicoidea).

3. Non-flying arthropods which emigrate to the trunk and canopy region do not occur. Conditions for a rich soil life are unfavorable. Pseudoscorpiones e. g. (11 species in 8 families) are almost exclusively represented by bark inhabitants.

7. Resumo

"Reações" das populações de animais em florestas inundáveis da Amazônia Central às inundações anuais, ainda estão pouco investigadas.

A fauna terrestre de artrópodos foi estudada em 1976, numa floresta de Várzea (região de água branca), e em 1976/77 num Igapó (região de água prêta) perto de Manaus. Serviram como aparelhos de captura fotoeclectores de solo, armadilhas de solo e fotoeclectores de árvore. Todos os animais capturados foram registrados e separados por ordem, familia e em alguns casos até espécies, exceto Collembola, Acari, Thysanoptera e uma parte de Diptera.

Igapó

1. Na região de troncos foram capturados aproximadamente 127.000 artrópodos (46 % Isopoda – na maioria Holometabola –, 32 % Arachnida, 22 % Isopoda e Myriapoda). Formicoidea foi dominantes (71 espécies), assim como Pseudoscorpiones, Araneae e Diplopoda. Do solo da floresta, cerca de 80.000 artrópodos foram capturados (90 % Insecta – na maioria Holometabola – 9 % Arachnida, 1 % Isopoda e Myriapoda).

2. A densidade da atividade, assim como a abundância da emergência dos artrópodos, mudam durante o ano. No período da seca dominam os insetos holometabolos, no período da chuva dominam os Arachnida, Myriapoda, e Isopoda no solo e em troncos da floresta.

3. Numerosos artrópodos, sobretudo aqueles incapazes de voar, sobrevivem à fase submersa (Março/Abril – Agosto/Setembro) evidentemente na região do tronco e da copa. Uma grande parte, no entanto, perece durante a inundação, muitos ficam como presa dos artrópodos predadores, particularmente de Formicoidea. No início do período da chuva (em Dezembro), migrações para cima do tronco aumentam, assim como migrações para baixo do tronco, proximo ao fim da fase submersa, sobretudo de Arachnida e Myriapoda. Migrações no tronco (para cima/para baixo) e chegadas no tronco são regulados em grande escala pelos fatores abióticos (umidade do solo, umidade relativa do ar) mudando com o clima (periodo chuva/seca).

4. O desenvolvimento de muitos artrópodos é bem sincronizado com as flutuações anuais da água. Isto é mostrado pelos Pseudoscorpiones (18 espécies de 8 familias, habitantes de litter e de casca) e pelos Meinertellidae (2 espécies).

5. A fauna de artrópodos do Igapó incapazes ou com capacidade limitada de voar, está classificada em grupos terrícolas e arborícolas ("nonmigrantes", "migrantes").

Várzea

1. Aproximadamente 45.000 artrópodos foram capturados na região do tronco (94 % Insecta – principalmente Formicoidea, assim como Coleoptera –, 5,7 % Arachnida, 0,3 % Isopoda e Myriapoda). Do solo da floresta, cerca 2.000 animais foram estudados (91,1 % Insecta – na maioria Holometabola –, 8,3 % Arachnida, 0,6 % Myriapoda).

2. Os artrópodos da Várzea parece que são na maioria habitantes da região do tronco e da copa. Muitos deles vêm durante a fase emersa para o chão da floresta, para a oviposição (esp. Diptera) ou nutrição (esp. Formicoidea).

3. Artrópodos incapazes de voar, os quais emigram para a região dos troncos e das copas, não existem. As condições para uma rica fauna no solo não são favoráveis. Os Pseudoscorpiones por exemplo (11 espécies de 8 familia) são quase exclusivamente representados por habitantes da casca.

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10. Abbreviations and Symbols

BE =	arboreal photo-eclector (s)
BoF =	pitfall trap (s)
E =	ground photo-eclector (s)
Ind. =	individuals
N, N' =	total catch
RS =	study area Curarí Island at the Solimões River (Várzea)
Tend. =	tendency
TM =	study area Tarumã Mirím River (Igapó)
Σ =	sum
$\Sigma\Sigma$ =	total sum
ad =	adult (imagines)
lv =	larval (larvae)
r =	correlation coefficient
↑ =	trunk migration – upwards (and trunk approach)
↓ =	trunk migration – downwards (and trunk approach)

Author's address:

Dr. Joachim Adis
Max-Planck-Institut für Limnologie
Arbeitsgruppe Tropenökologie
Postfach 165
2320 Plön/Holstein

West Germany

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